TitraLab®

TIM960, TIM965 and TIM980 Titration Workstations

User's Guide

D21T078

D21T078 • Printed by Radiometer Analytical SAS • 2006-07B

Contents

General information

Safety Information

Please read this entire manual before unpacking, setting up, or operating this equipment. Pay attention to all danger and caution statements. Failure to do so could result in serious injury to the operator or damage to the equipment. To ensure that the protection provided by this equipment is not impaired, do not use and do not install this equipment in any manner other than that specified in this manual.

Precautionary Labels

Read all labels and tags attached to the instrument. Personal injury or damage to the instrument could occur if not observed.

	This symbol, if noted on the instrument, references the instruction manual for operation and/or safety information.
	Electrical and electronical equipment marked with this symbol may not be disposed of in European public disposal systems after 13 August of 2005. In conformity with European local and national regulations (EU Directive 2002/96/EC), European electrical equipment users must now return old or end-of life equipment to the Producer for disposal at no charge to the user. Note: For equipment supplied or produced by "Radiometer Analytical", please contact www.hach-lange.com and select your country for instructions on how to return your equipment for proper disposal."
	This symbol, when noted on the product, identifies the location of a fuse or current limiting device.

Warning !

The TitraLab system has been developed to meet the requirements of volumetric titration applications. It is therefore aimed at experienced users who have the knowledge required to operate the instrument and implement the security instructions enclosed. Please remember that the TitraLab system must not, under any circumstances, be used to perform tests on living beings.

We accept no responsibility for using the TitraLab system and its peripheral devices under conditions that are not specified in this Reference Manual and its associated User's Guide (part no. D21T078).

Compliance with FCC rules, part 15
Information to the user

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception which can be determined by turning the equipment off and on, the user is encouraged to try to correct interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Warning!!

Changes and modifications that are not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

1. Introduction

Read me!

The interface of the Titration Manager has been specially designed to clearly guide you through every step of the programming and running of the analyses, whether you are a supervisor or a routine user.

An important part of this interface is to check and control the presence of different elements necessary to run the defined application.

Thanks to a RFID tag attached to each burette stand, the Titration Manager is able to know at any moment which reagent is installed on which burette stands. Handling burettes and reagents is easier and more secure. See "Titrant management using RFID tags" at the end of this chapter.

Working in Supervisor mode

The Supervisor has access to all parameter edition screens for *creation and edition* purposes.

When programming in **“SUPERVISOR”** mode, it is recommended to work in stages. These stages *should* be carried out in the order described below:

1. Define your electrode(s)

Identify electrodes (including temperature sensors) to be used for the analysis.

Electrodes can be created from the following lists, Catalogue, Other or Copy from. When creating the electrode, define if electrode calibration is required (or not), if yes specify the “periodicity” of the calibrations and the pH standards to be used. Refer to chapter 3.

2. Define reagent

Identify reagents to be used for the analysis.

Reagents can be created from the following lists, Catalogue, Other, Copy from. When creating the reagent, define if reagent calibration is required (or titre entered manually), if yes specify the “periodicity” of the calibrations and the calibration method. Refer to chapter 3.

If you are to perform a calibration, make sure that the electrode(s) used for the calibration are the same as those used in the method.

3. Create a new method or Edit a pre-programmed one

Create the measurement or titration method to be used for the analyses. Enter the parameters required to calculate the results, refer to chapter 3.

When you have finished programming, select the method or pre-programmed application, refer to Short-Form Reminder no. 3.

If a sample changer is to be used, define the sample changer in the Configuration menu before selecting `Working mode = SAC sequence` in the main window.

4. Check icons

The following icons indicate the exact state of your working system.

Sunny icon:

Everything is OK. Run the method or sequence.

Sunny icons are required to run the method.

Cloudy icon:

Action required within 12 or 24 hours. For example calibration and/or reagent bottle exchange.

Stormy icon:

Electrode/reagent calibration date elapsed or electrode(s)/ reagents(s) not installed.

Question mark:

It is a programming error, reagent and/or electrode is/are not defined in the selected method. Revise the method programming.

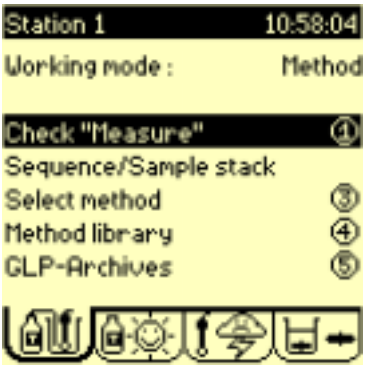
Calculator icon:

Reprocessing mode (Working mode = Reprocessing) is set on the instrument.

Refer to Reagent and Electrode windows.

When Cloudy/Stormy/Question mark icons appear, press 1 to run the "Check" command.

Depending on the icons displayed, the Titration Manager will automatically guide you through the steps necessary to run the analysis.



a. Connect/install the electrode(s)

Connect/install electrodes and temperature sensors, Refer to Short Form Reminder no. 1.

b. Install reagents(s)

If the burette is not installed, the Titration Manager will automatically guide you to the Install burette procedure. Refer to Short Form Reminder no. 2 and "Reagent management using RFID tags" at the end of this chapter.

c. Calibrate electrode(s)

Refer to chapter 4 and Short Form Reminder no. 4.

d. Calibrate reagent(s) or Enter titre

Run the reagent calibration (refer to chapter 4 and Short Form Reminder no. 5) or enter the titre manually.

e. Run the method or the sequence, when Sunny icons are displayed,

Refer to Short Form Reminder no. 6 and 7.

Working in Routine mode

In **“ROUTINE”** mode you are guided at every step, thanks to the clear-text messages and the icons present on the large graphic display.

A Routine operator has access to all the displays for *checking* purposes.

Running methods

When working in **“ROUTINE”** mode, it is necessary to install your titration system according to the selected method or sequence, prior to running a method or sequence.

1. Select the method or sequence

Refer to chapter 4.

2. Check icons and run the method or sequence

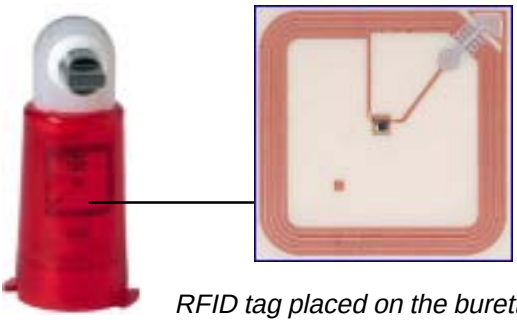
Refer to page 8.

Reagent handling using RFID technology

What's RFID means and how does it work?

Radio **F**requency **ID**entification (RFID) is a generic term that is used to describe a system that transmits the identity (in the form of a unique serial number) of an object or person wirelessly, using radio waves. It's grouped under the broad category of automatic identification technologies.
It's the combination of a "tag" and a "reader". A typical RFID tag consists of a microchip attached to a radio antenna mounted on a substrate. The chip can store data. The reader is used to retrieve the data stored on an RFID tag. A typical reader is a device that has one or more antennas that emit radio waves and receive signals back from the tag. The reader then passes the information in digital form to a computer system.

In our assembly an RFID tag is attached inside the sleeve of the burette stand. This tag is clearly visible.



RFID tag placed on the burette stand

The RFID reader is mounted inside the burette tap block at the back of the titrator and located with a small RFID graphic icon.When the burette is installed, the tag and the reader are face to face.

RFID reader mounted inside the burette tap block

Which data contains a burette stand RFID tag?

All identification or location information concerning the burette stand and its associated reagent (if a reagent is installed on that stand). The tag also supports the reagent GLP data.

For the burette stand:

- burette ID and burette volume: this information is present in the tag as a factory setting and cannot be erased and changed,
- burette first installation date.

For the reagent:

- reagent identification parameters entered by the user while creating the reagent: Reagent ID, target titer, expiry date, batch number and calibration method parameters (if a calibration is requested),
- reagent last calibration date and results.

The Burette ID, Burette volume, Reagent ID and Reagent target titer are read on starting the following user actions:

- burette installation, replacement and removal,
- reagent installation, replacement (reagent of 2 different IDs), bottle exchange and reagent removal.

At the end of these actions, new data is saved in the RFID tag of the burette stand.

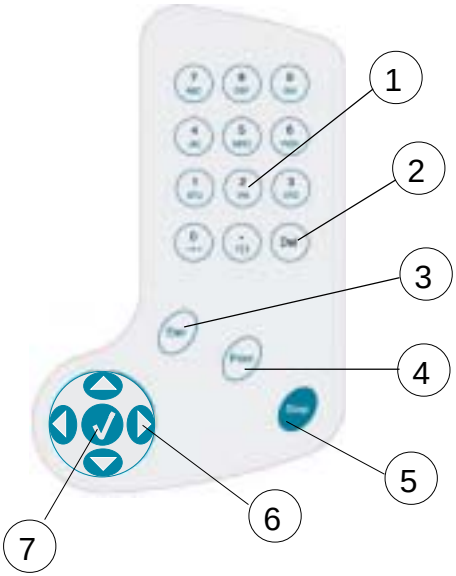
Benefits of using RFID technology on burette stands

The Titration Manager knows at any moment which reagent is installed on which burette stands.

- Handling burettes and reagents is easier.
  For example, no need to enter data on burette installation. The Titration Manager reads automatically the burette and install reagent identification data (burette ID and volume),
- RFID tag prevents the operator from using wrong reagents.
  On installing a reagent, the Titration Manager detects automatically if a reagent is already installed or not. If a reagent with a different ID is already installed, a reagent replacement is initiated. If a reagent with a same ID is already installed, no installation is performed and a reagent check data screen is displayed instead.
  On removing a burette, the Titration Manager detects automatically if a reagent is already installed or not. If a reagent is installed, the Titration Manager removes the reagent before removing the burette.
- RFID tag supports the complete reagent GLP data.
  By this way, you ever use updated reagents data and traceability of result is ensured. There is no possible permutation of identification data from one reagent to another.

2. Getting started

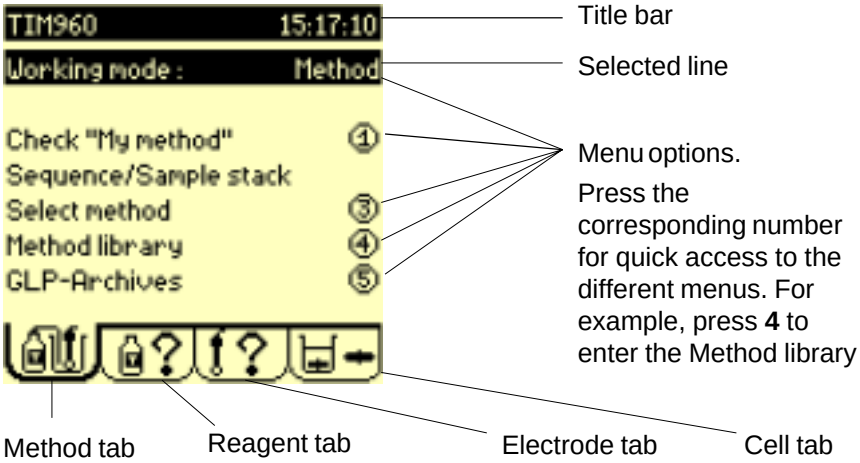
Keyboard



1. Alphanumeric keypad to enter data and parameters on the same principle as mobile telephones. These keys can also be used for quick access to the different menus; refer to the display on the following page.
2. **Del**: deletes the character on which the cursor is positioned. Operator may end the analysis before the max. titration time or the max. volume have been reached, if he considers his analysis finished. Calculations are performed.
3. **Esc**: returns to the previous screen. During analysis, this key allows you to enter the method, electrode and titrant menu.
4. **Print**: prints the data concerning the screen displayed.
5. **Stop**: stops an analysis or a burette function. Press this key for 3 seconds in the Main window to gain access to the setup parameters.
6. RIGHT, LEFT, UP, DOWN arrow keys are used to move to different options within the menus.
7. ✓: confirms a data entry, a message or a function asked for by the user.

Basic principles

When the instrument is switched on, the Main window is displayed. When the instrument is switched on for the first time the screen will be as follows:



If required, you can adjust the contrast of the display by:

- pressing **0** to increase the brightness,
- pressing **7** to decrease the brightness.

The title bar in the menu indicates the instrument name (TIM960 for example) and the actual time. You will be shown how to personalise the name and adjust the time further on in the manual.

The RIGHT and LEFT arrow keys allow you to move from one tab to the other and enter the `Reagent`, `Electrode` and `Cell menus`.

- Work your way through the 4 tabs, then back to the Main window.

The UP and DOWN keys allow you to select a line. To enter an option, select the line, and press ✓. You can also press the corresponding numerical key.

1. Press **4** or select the line Method library and press ✓ to enter the Method library screen. Press **Esc** to return to the Main window.

2. Select the line `Working mode` and press ✓. The following options are available:

   Method: to run a single method.

   Sequence: to create or run a sequence of methods. Beakers are manually changed between two method runs.

   SAC Method: to run a single method to be performed using a sample changer.

   SAC Sequence: to create or run a sequence of methods to be performed using a sample changer.

   Reprocessing: to reprocess the last curve with different parameters from the original method and thus recalculate a result.

   If you select a Reprocessing working mode, the Method, Reagent and Electrode tabs display a calculator icon as shown below:

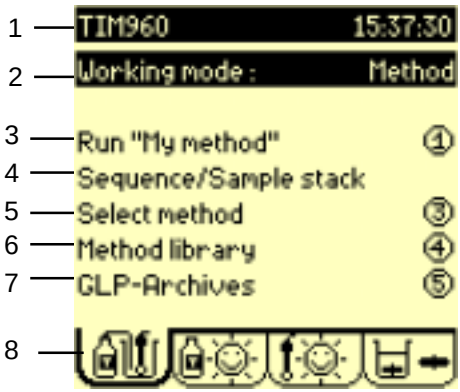
   Note: the working mode selected will have no effect on the type of method you wish to create.

   Do not forget to define the sample changer in the Configuration menu before selecting SAC Method or SAC Sequence.

3 Press ✓ to confirm your selection.

Main window

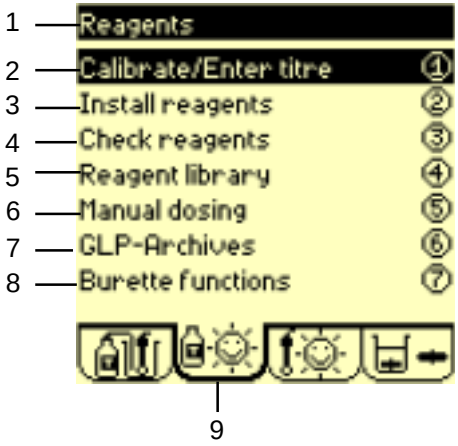
When the instrument is switched on the Main window is displayed.



1. **Title bar**: indicates the instruments name and the current time.
2. **Working mode**: Select the way in which you want to work. Choose from Method, SAC Method, Sequence, SAC Sequence, Reprocessing; refer to previous page.
3. **Check** or **Run**: check or run the selected method /sequence. The method can be run when 2 sunny icons are displayed in the Reagents and Electrodes tabs. ***If 2 cloudy/stormy icons are displayed, activate the "Check" command. The Titration Manager will automatically guide you through the necessary operations required to solve the problem(s)***.
4. **Sequence/sample stack**: if `SAC Sequence` or `Sac Method` has been selected in step 2 above. Program the sample stack. Select or edit the method sequence.
5. **Select method**: select method to be used for the analyses.
6. **Method library**: supervisor use only: create, edit, reset and delete methods to correspond to your specific needs.
   Or **Display methods -** routine use only : display the main parameters of the selected method.
7. **GLP-Archives**: access GLP tables and visualise the stored method sample results and global variables.
8. **Method tab**: Animated icon indicates when a method/sequence is running.

Reagents window

Use the **RIGHT** arrow key to move to this window.



1. **Title bar**: indicates the name of the window.
2. **Calibrate/Enter titre**: determine the concentration of the titrant (titre) by running a calibration or a calibration sequence or by entering the titre manually.
3. **Install reagents**: install or replace reagents in a method or sequence.
4. **Check reagents**: verify the identification parameters of the reagents used in the working method or sequence.
5. **Reagent library**- supervisor use only: create, edit, reset and delete reagents to correspond to your specific needs.
6. **Manual dosing**: delivers a reagent at a given speed and measures a signal at a connected electrode.
7. **GLP-Archives**: access GLP tables and visualise the stored reagent calibration results.
8. **Burette functions**: fill, empty, flush, rinse and burette service position. Global flush of all installed burettes simultaneously.
9. **Reagent tab**: Reagent status icon indicates the state of the reagent system. Five types of icons can be displayed.

Sunny icon. The reagent calibration or manual entry of the titre has been performed for all the reagents present in the system. Everything is just right!

Cloudy icon. The reagent calibration of one of the reagents in the system should be performed within 12 or 24 hours.

The expiry date of one of the reagents in the system will elapse in less than one week.

Stormy icon. The reagent calibration or the expiry date of one of the reagents in the system has elapsed.

If acceptance limits have been set for the calibration: at least one calibration result lies outside the programmed acceptance limits.

At least one of the reagents present in the system has not been installed.

Check the sequence or method, (press **1** in the Main window). The instrument prompts you to do the necessary operations. You are guided step by step.

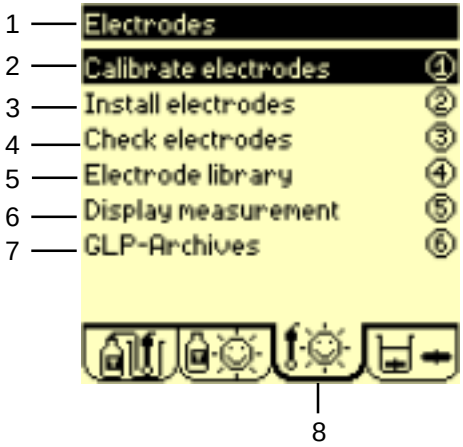
Question mark. There is a problem in the editing of the reagent system. You need to be in Supervisor mode to solve the problem. Check the sequence/method parameters of the reagent or the electrode.

Check the sequence or method, (press **1** in the Main window). The instrument indicates the possible errors and prompts you to correct them until **?** disappears.

Calculator icon. Reprocessing mode (Working mode = Reprocessing) is set on the instrument. This icon is displayed irrespective of the status of the reagent system used.

Electrodes window

Use the **RIGHT** arrow key to move to this window.



1. **Title bar**: indicates the name of the window.
2. **Calibrate electrode**: run a calibration or a calibration sequence using the installed electrodes.
3. **Install electrodes**: connect, disconnect or replace electrodes in a method or sequence.
4. **Check electrodes**: check the identification parameters of the electrodes used in the method or sequence.
5. **Electrode library** - Supervisor use only: create, edit, reset and delete electrodes stored in the instrument.
6. **Display measurement**: displays mV and/or pH and/or temperature at a connected electrode of the electrode system.
7. **GLP-Archives**: access GLP tables and visualise the stored electrode calibration results.
8. **Electrode tab**: Electrode status icon indicates the state of the electrode system. Five types of icons can be displayed.

Sunny icon. The calibration has been performed on all the electrodes present in the system. Everything is just right!

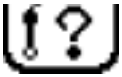
Cloudy icon. The electrode calibration of one of the electrodes present in the system should be performed within 12 or 24 hours.

Stormy icon. The calibration date has elapsed for one of the electrodes present in the system.

If acceptance limits have been set for the calibration: at least one calibration result lies outside the programmed acceptance limits.

At least one of the electrodes present in the system has not been installed.

Check the sequence or method, (press **1** in the Main window). The instrument prompts you to do the necessary operations. You are guided step by step.



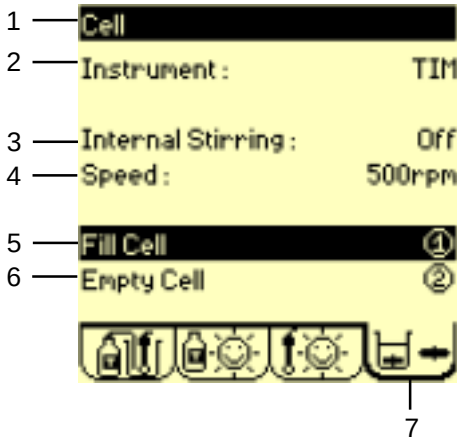
Question mark. There is a problem in the editing of the electrode system. You need to be in Supervisor mode to solve the problem. Check the sequence/method parameters of the reagent or the electrode.

Check the sequence or method, (press **1** in the Main window). The instrument indicates the possible errors and prompts you to correct them until **?** disappears.

Calculator icon. Reprocessing mode (Working mode = Reprocessing) is set on the instrument. This icon is displayed irrespective of the status of the electrode system used.

Cell window

Use the **RIGHT** arrow key to move to this window.



1. **Title bar**: indicates the name of the window.
2. **Instrument**: to select the stirrer of the Titration Manager or an ABU62 connected to the Titration Manager.
3. **Internal stirring**: command stirrer On/Off.
4. **Speed**: select the internal stirring speed, from 100 to 1100 rpm by steps of 50 rpm.
5. **Fill cell (TIM980 only)**: to fill the Karl-Fischer cell with solvent.
6. **Empty cell (TIM980 only)**: to empty the Karl-Fischer cell.
7. **Cell tab**: animated icon indicates when the magnetic stirrer or propeller is operating.

Apply internal stirring

1. For `Instrument`, select the stirrer of the Titration Manager or the stirrer of an ABU62 connected to the Titration Manager.
2. Select `Internal stirring = ON`,
3. Press ✓ in the field `Speed` and select a stirring speed.

Apply external stirring

1. Connect the Stirring Propeller, part no. 847-731, to the Titration Manager or ABU62 **Propeller** socket. Line 3 is automatically replaced by `External stirring`.
2. For `Instrument`, select the stirrer of the Titration Manager or the stirrer of an ABU62 connected to the Titration Manager.
3. Select `External stirring = ON`.
4. Adjust stirring by turning the stirring propeller knob. You can consult the corresponding table between the position (1 to 9) and the stirring speed by pressing ✓ in the field `Speed setting`.

Fill the Karl-Fischer cell (TIM980 only)

1. For `Instrument`, select TIM.
2. Press **1** (`Fill cell`).
3. Press the TIM980 filling cell button  then press ✓.

Empty the Karl-Fischer cell (TIM980 only)

1. For `Instrument`, select TIM.
2. Press **2** (`Empty cell`).
3. Press the TIM980 emptying cell button  then press ✓.

System configuration

Proceed as follows to configurate your workstation

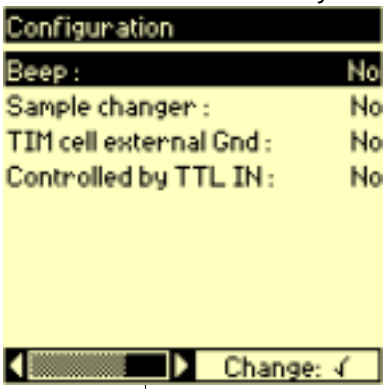
1. Press **Stop** for 3 seconds in the Main window to enter the Setup menu.
2. Supervisor code:
   Entering a `Supervisor code` enables you to differentiate between the 2 operator modes: Routine and Supervisor:
   In Routine mode, the user is able to select and run methods. In Supervisor mode, the user can create, edit, select and run methods. A Supervisor code is also used to protect your parameters from any unwanted changes.
   - Continue without entering a Supervisor code.
3. Press **1** to enter the `Configuration` menu.

Use the UP and DOWN arrow keys to select the parameter.

Horizontal scroll bar

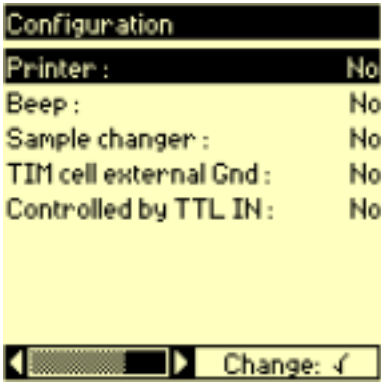
The position of the bar indicates the first screen in the `Configuration` menu. Use the RIGHT arrow key to move to the next screen.

4. Press the RIGHT arrow key.



The position of the bar indicates the last screen in the `Configuration` menu.

5. Press the UP arrow key.



6. Press the LEFT arrow key to return to the first screen in the `Configuration` menu.

Choosing the language

Choose your language for displays and printouts in the following way:

1. Use the UP and DOWN arrow keys to select the Language line.
2. Press ✓ to change a parameter as indicated at the bottom of the screen.

3. Select the language.

Esc allows you to leave the screen without changing the language.

Setting the date and time

The current date and time are entered in the following displays:

1. Select `Time`.

Enter the hours (from 00 to 23).

2. RIGHT arrow key.

Enter the minutes (from 00 to 59).

3. RIGHT arrow key.

Enter the seconds (from 00 to 59).

The LEFT arrow key allows you to return to the previous screen to modify an entered value.

4. Press ✓ to confirm (as indicated on the screen).

5. Select `Date`.

Enter the day (from 00 to 31).

6. Press RIGHT arrow key.

Use the UP/DOWN keys to select the month.

7. Press RIGHT arrow key.

Enter the year (from 2000 to 2069).

8. Press ✓.

Customising the workstation

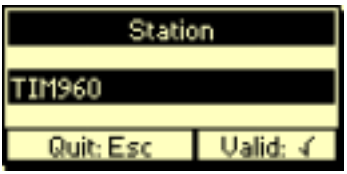
You can assign a name to your workstation, which will be permanently displayed in the title bar of the `Main window`. Typing the name will allow you to get used to using the instruments keypad.

1. Before leaving the `Configuration` menu:
   - Select `PC keyboard`,
   - select `English (US)`.

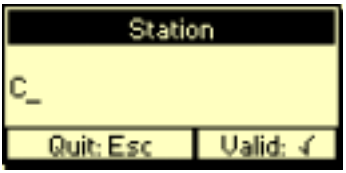
   This allows you to use a QWERTY keyboard.
2. Press **Esc** to return to the `SETUP` menu.
3. Press **3** (`Customise`).

Customise screen displayed for a TIM960.

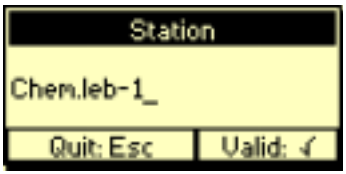
4. Press ✓ to select the `Station` parameter.

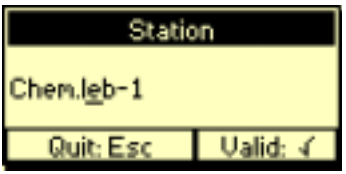


5. To replace "TIM960" by "Chem.lab-1", proceed as follows:
   - Press **7** until the letter "C" appears, then release the key. The cursor moves to the next position.

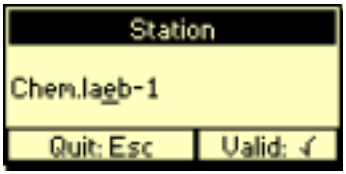


- Press 9 until the letter "h" appears.
- Continue until you have entered (em.lab-1).
- To correct a typing error, proceed as follows:

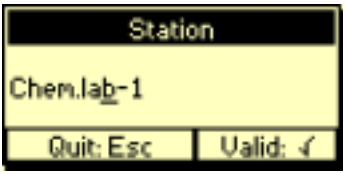




Press the LEFT arrow key to position the cursor on the letter "e". Press 7 to enter the letter "a".



The letter "e" has been inserted between the letter "a" and the letter "b".

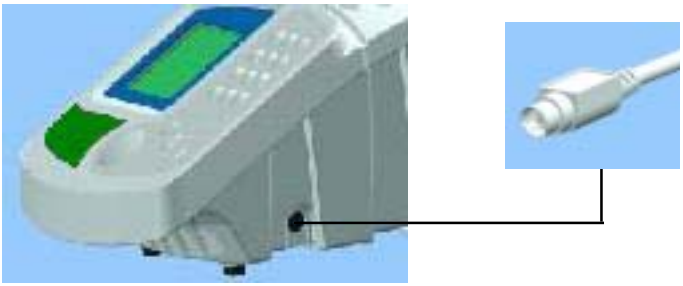


Press **Del** to delete the "e".

- Press ✓ to confirm the entry.

6. You can also use a PC keyboard to enter alphanumeric characters.

   - Connect the PC keyboard to the 6-pin plug situated on the left hand side of the instrument.



   - Select the line `Radiometer Analytical`. This line is used to enter information concerning the workplace, user(s) name(s), location, address etc.
   - Enter the text using the PC keyboard (maximum of 32 characters can be used).
     If the characters shown on the display do not correspond to the ones typed on the keyboard, redefine your keyboard type. To do this, press **Esc** then **1** and select `PC keyboard`.
   - Press ✓ to confirm.

You have now finished the getting started section. Press **Esc** to leave the Customise screen, then press **5** to quit the SETUP menu.

3. Programming guidelines

Only the Supervisor is allowed to program the menus, Electrode, Reagent, and Method.

To select the Supervisor mode, press **Stop** for 3 seconds in the `Main window` and enter the Supervisor code. Press **5** (Exit) and select `Return in mode = Supervisor`.

✶ IMPORTANT ✶

For first time users, it is recommended to program the instrument as follows:

1. **Create the electrode(s)** to be used to perform the measurements.
2. **Create the reagent(s)** to be used during the titration.

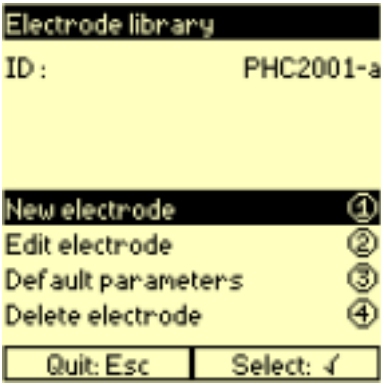
Then finally,

3. **Create the method(s)**, which will consequently use the electrode(s) and reagent(s) created in the first two steps of programming.

Once you have finished programming, make sure that NO question marks "?" are displayed in the Reagent and Electrode tabs!

Create an electrode

1. Press **4** `Electrode Library`, then **1** `New electrode`.



2. Press ✓ in the `Function` field and select the function of the electrode, refer to the table below:

Electrode type	Select function
Single pH	pH
Combined pH w/wo temp. sensor	pH
Single metal/redox	mV (i=0)
Combined metal/redox w/wo temp. sensor	mV (i=0)
Single ISE	mV (i=0)
Combined ISE w/o temp. sensor	mV (i=0)
Reference single	Reference
Temperature sensor	T°C
Ground metal	Ground
Double metal	mV (i > 0)

3. Press ✓ in the `ID` field.
4. Select `Other` in the `From` field.
   The option `From = Catalogue` allows you to create an electrode from a list of Radiometer Analytical electrodes.
5. Enter the identification (`ID`) of the electrode, (up to 16 characters).
6. Press **1** twice.

7. Select the electrode `Type`, for electrodes with pH or mV functions:
   - **Single pH** - pH electrode (no reference part),
   - **Combined pH** - pH electrode with a reference part (with or without temperature sensor),
   - **Single metal/redox** - mV (i=0) function electrode with a reference part,
   - **Combined metal/redox** - mV (i=0) function electrode with a reference part (with or without temperature sensor),
   - **Single ISE -** mV (i=0) function ion selective electrode with no reference part,
   - **Combined ISE -** mV (i=0) function ion selective electrode with a reference part (with or without temperature sensor).
8. When a **combined electrode** has been defined, the instrument will prompt you to specify if it has a built-in temperature sensor or not.

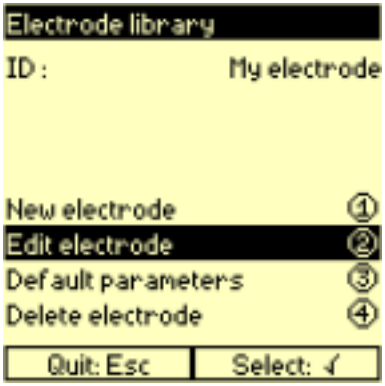
   When a **single electrode** has been defined, the instrument will prompt you to define a reference electrode in the `Edit electrode` screen.
9. When a **combined or a reference electrode** has been defined, enter the potential (in mV) of the reference element versus the Standard Hydrogen Electrode (SHE).
   This parameter enables to run calibration with automatic buffer recognition when working with different reference electrode systems.

   On the next page, see the table giving the potential at 25°C versus the SHE of a few "reference elements/filling solution" couples.
10. When a **combined pH** or a **single pH** electrodes has been defined, enter the internal pH of the electrode (pH int).
11. Press **1** to confirm.
12. Edit the electrode parameters (see page 37).

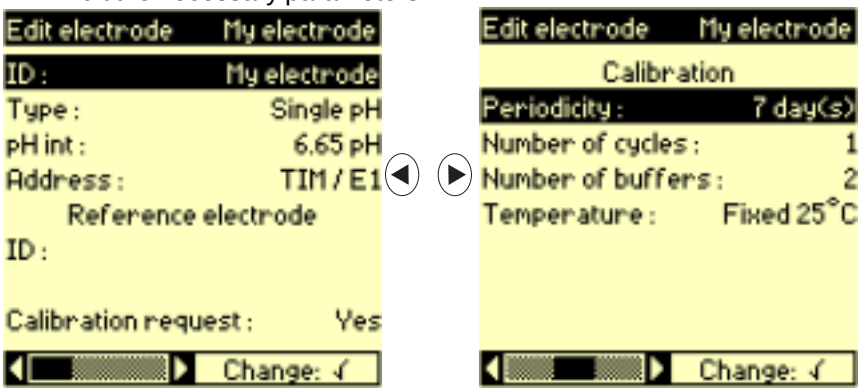
Reference element and filling solution	Potential versus SHE	Radiometer Analytical Electrodes
Hg/Hg_2Cl_2 - Saturated KCl *SCE: Saturated Calomel Electrode*	+244 mV	pHC4000, pHC4001, pHC4006, XC601, REF401, REF421, REF451, XR100, XR110, XR130, XR150, MC408Pt
Hg/Hg_2Cl_2 - 1M LiCl	+280 mV	REF921
Hg/Hg_2SO_4 - Saturated K_2SO_4	+651 mV	REF601, REF621, XR200, XR230, MC602Pt, MC6091Ag
Hg/Hg_2SO_4 - 1 M H_2SO_4	+616 mV	
Hg/HgO - 0.1 M KOH	+174 mV	XR400, XR430, XR440
Ag/AgCl - Saturated KCl	+199 mV	XR300, XR820, XC100, XC111, XC120, XC161, XC200, XC250,
Ag/AgCl - 3 M KCl	+208 mV	pHC3001, pHC3005, pHC3006, pHC3011, pHC3081, pHC3185, REF321, REF361, MC3051Pt, ISEC301F
Ag/AgCl - 1 M KCl	+235 mV	
Ag/AgCl - 0.6 M KCl (sea water)	+250 mV	
Red Rod - Saturated KCl	+199 mV	pHC2001, pHC2002, pHC2003, pHC2005, pHC2011, pHC2015, pHC2051, pHC2085, pHC2401, pHC2441, pHC2501, pHC2601, pHC2701, REF200, REF201, REF251, REF261, MC2095Sb, MC201Au-8

Edit electrode screen

1. Press **4** `Electrode library`.
2. Press ✓ and select the electrode to be edited from the list.
3. Press **2** `Edit electrode`.



4. Edit the necessary parameters.



a. Electrode address: indicates which socket the electrode is connected to:

. TIM / **E1**, **E2**, **Ref**, **Temp**, **GND** or **Pt-Pt** (socket of the Titration Manager),

. ABU1 / **E1**, **E2**, **Ref**, **Temp**, **GND**, **Pt-Pt** (socket of an ABU62 connected to the **Local** socket of the Titration Manager),

. ABU2 / **E1**, **E2**, **Ref**, **Temp**, **GND**, **Pt-Pt** (socket of an ABU62 connected to the **Slave** socket of another ABU62 connected to the **Local** socket of the Titration Manager).

b. Select whether the electrode should be calibrated or not (`Calibration request = Yes` or `No`).
If `Calibration request = No`, the electrode parameter edition is completed.

c. Enter the `Periodicity`.

Indicates the maximum period of time between two calibrations. If the period of time is exceeded, pH measurements can no longer be performed using this pH electrode and the electrode must be calibrated.

d. Enter the `Number of cycles`.

Enter the number of times the calibration should be repeated. This is the number of beakers to be prepared for a given standard. For each standard, the result will be calculated from the mean measured value.

e. Enter the `Number of buffers` (1 to 5) to be used for the calibration.

f. Specify if a temperature sensor is in use.

If a temperature sensor is in use, select `Probe`.

If the temperature is entered manually via the numeric keypad, select `Entered`.

If the calibration is to be performed at 25°C, select `Fixed 25°C`.

If you have selected `Temperature = Probe`, a temperature sensor must have been selected in the `Parameters` screen.

Programming electrode parameters

1. If `Calibrate request = Yes`, enter the electrode definition parameters and go to the last `Edit electrode` screen.

2. Press **1**:

   To enter `Calibration parameters`: general parameters used during the calibration,

3. Press **2**:

   To enter `Calibration solutions` parameters concerning the standards used for the calibration,

4. Press **3**:

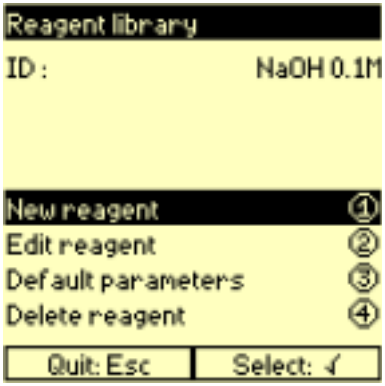
   To enter the `Results` parameters concerning acceptation criteria that you can set on the results.

5. Press **4**:

   To enter `Printouts` parameters defining the calibration report to be printed.

Create a reagent

1. Press **4** `Reagent library` then **1** `New reagent`.



2. Press ✓ in the `New reagent` screen.
3. Select `From = Other`.
   The option `From = Catalogue` allows you to create a reagent from a list of commonly used reagents.
4. Press ✓ in the `ID` field and enter the reagent name (up to 16 characters).
5. Enter the "approximate" titre of the reagent (5 characters) in the `Target titre` field.
6. Enter the units (mM, M, mN, N) indicated on the reagent bottle. Use the following: mM = mmol/l, M = mol/l, mN = meq/l, N = eq/l or mg/ml (Karl-Fischer reagents only).

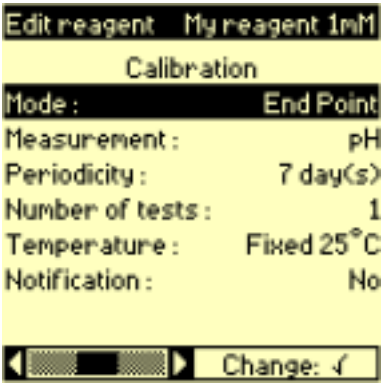
   Note: If molar units are selected (mM or M), it is necessary to enter the stoichiometric coefficients for the chemical reaction in the `Results` screen.

   For info: once the units have been confirmed, they are added to the reagent ID and target titre.
7. Press **1** twice to create the reagent.
8. Edit the reagent parameters (see next page).

Edit reagent screen

1. Press **4** `Reagent library`.
2. Press ✓ and select the reagent to be edited from the list.
3. Press **2** `Edit reagent`.

4. Edit the necessary parameters.



a. Modify the units (mM, M, mN, N) indicated on the reagent bottle. Use the following: mM = mmol/l, M = mol/l, mN = meq/l, N = eq/l or mg/ml (Karl-Fischer reagents only).

b. Address:
Indicates the location of the burette containing the reagent:

. TIM/1 or TIM/2 (position 1 or 2 on the Titration Manager),

. ABU1/1 or ABU1/2 (position 1 or 2 of an ABU62 connected to the **Local** socket of the Titration Manager),

. ABU2/1 or ABU2/2 (position 1 or 2 of an ABU62 connected to the **Slave** socket of another ABU62 connected to the **Local** socket of the Titration Manager).

c. Select `Titre = Enter` or `Calibrate`,
Select `Enter i` if you already know the titrant concentration and do not wish to perform a calibration.
Select `Calibrate`, if you wish to perform a calibration. Enter the calibration parameters; see below.

d. Select the type of method for `Mode`. Depending on your Titration Manager, you have the choice between End Point, Monotonic IP, Dynamic IP, Continuous IP or Karl-Fischer.

e. Select the measurement mode for the calibration (pH, mV or mV at imposed current).

f. Enter the `Periodicity`.

Indicates the maximum period of time between two calibrations. If the period of time has elapsed, calibrations can no longer be performed using this titrant.

g. Enter the `Number of tests`.

This is the number of times the calibration method will be repeated, i.e. the number of beakers to prepare for the calibration.

h. Specify if a temperature sensor is in use.

If a temperature sensor is in use, select `Probe`.

If the temperature is entered manually via the numeric keypad, select `Entered`.

If the calibration is to be performed at 25°C, select `Fixed 25°C`.

If you have selected `Temperature = Probe`, a temperature sensor must be selected in the `Calibration parameters` screen.

i. If you want a message to be displayed upon starting the calibration, select `Notification = Yes` then enter the message (3 lines of 32 characters maximum).

Programming reagent parameters

1. If `Titre = Calibrate`, enter the reagent definition parameters and go to the last `Edit method` screen.

2. Press **1**:

   To enter `Calibration parameters`: general parameters used during the calibration.

3. Press **2**:

   To enter `Standard` parameters concerning the standard solution used for the calibration.

4. Press **3**:

   To enter the `Results` parameters concerning acceptation criteria that you can set on the results and stoichiometric coefficients for the chemical reaction (if required).

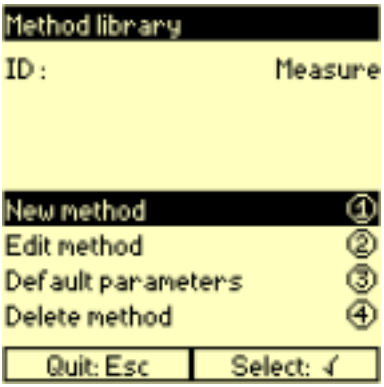
5. Press **4**:

   To enter `Printouts` parameters defining the calibration report to be printed.

Create a method

1. Press ✓ and select `Method`.

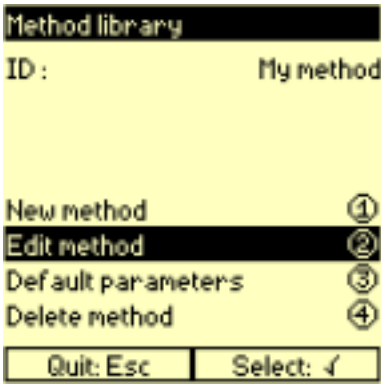
2. Press **4** `Method library` then **1** `New method`.



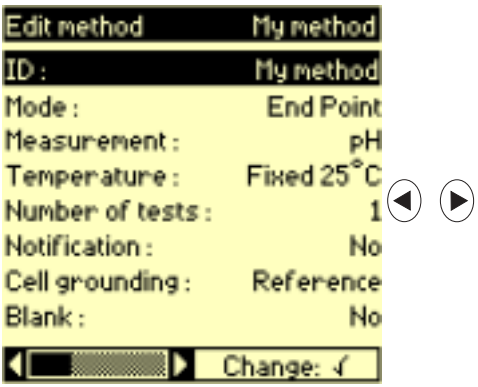
3. Press ✓ in the `ID` field.
4. Enter a method name (up to 16 characters).
5. Press **1**.
6. Edit the method parameters (see the next page).

Edit method screen

1. Press **4** `Method library`.
2. Press ✓, select the method to be edited from the list then press **2** `Edit method`.



3. Edit the necessary parameters.



a. Select the method mode. The modes available depend on the Titration Manager used:

- Measurement (pH, mV or mV at imposed current)
- End point (titration to a preset mV or pH end point)
- Coupled (methods chained in a same beaker)
- Continuous IP (Inflection point detection with continuous addition of the titrant)
- Monotonic IP (Inflection point detection with incremental addition of the titrant, increments of equal size)

- Dynamic IP (Inflection point detection with incremental addition of the titrant, increments of varying size)
- Karl-Fischer
- Addition (1 to 3 additions of reagent. No measurements. Additions are performed simultaneously or successively)

b. Select the measurement mode: pH, mV or mV at imposed current.

c. Select the way the temperature is to be measured.

- `Probe`: temperature sensor is required during measurements.
- `Entered`: temperature is to be entered manually using the keypad.
- `Fixed 25°C`: measurements are assumed to be performed at 25°C.

d. Enter the `Number of tests`, i.e. the number of times the method is to be repeated.

e. If you want a message to be displayed upon starting the method, select `Notification = Yes` then enter the message (3 lines of 32 characters maximum).

f. Select the way the cell grounding of the measuring electrode will be performed:

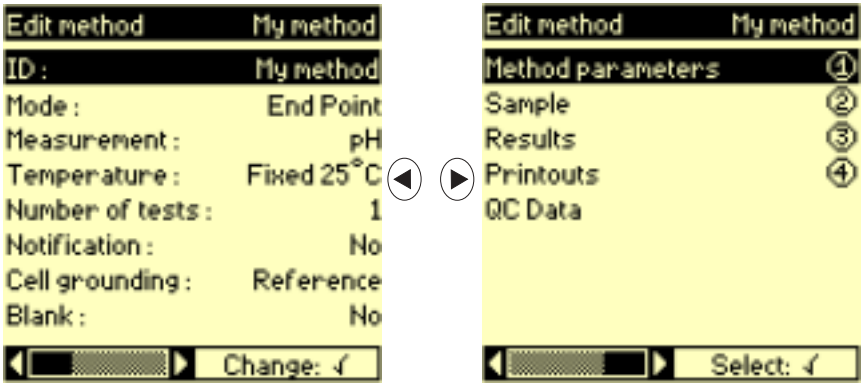
- `Reference`: reference electrode connected to the **Ref** socket on the titration system.
- `Metal`: metal electrode connected to the **GND** socket on the titration system. For titrations in very resistant medium.
- `Other`: an electrode which does not belong to the electrode system.

g. Blank: A blank or blank sample is usually a solvent used to dissolve or dilute the sample. This blank may contain traces of the species you are analysing. Select `Yes` for `Blank` when you want to subtract the volume of titrant used to titrate the solvent from the volume found for the dissolved or diluted sample.

h. QC sample: the concentration of a QC sample is known accurately and the composition is close as possible to that of the samples to be analysed. QC measurements enable you to perform quality control tests on the method used. Refer to the Reference Manual for more information concerning this option. Select `Yes` for `QC sample` to perform measurements on QC samples.

Programming method parameters

1. Go to the last Edit method screen.



2. Enter the parameters. The parameters displayed will all depend on the measurement type and mode selected.

3. Press **1**:
   To enter the `Method parameters`: general parameters concerning the electrode and reagent (when required) used by the method and the titration parameters.

4. Press **2**:
   To enter the `Sample` parameters: concerning the preparation of the sample to be analysed.

5. Press **3**:

   To enter the `Results` parameters defining the results, the acceptation criteria that you can set on the results and stoichiometric coefficients for the chemical reaction (if required).

6. Press **4**:

   To enter the `Printouts`: parameters defining the analysis report to be printed.

7. Press **5**:

   To enter the `QC data` (only available when QC sample = Yes): quality control parameters required when using QC samples.

4. Running analyses

✶ IMPORTANT ✶

Before pressing the **Run** key, check the following points listed below:

1. Select the method by pressing **3** in the main window.
2. If **Question marks "?" are present in the electrode and/or reagent tabs**. Programming error due to missing electrode/reagent parameters. Contact your supervisor.
3. **Connect/Check electrode(s)**. *Refer to Short-Form Reminder no. 1.*

   When installing/checking an electrode system, do not forget to **connect all** the installed electrodes to the Titration Manager or ABU62 sockets and **to install these electrodes** on the Titration Manager (Location = TIM) or the SAC80 or SAC90 Sample Changer (Location = SAC).

   It is important to immerse, in the same measuring beaker, all the installed electrodes having the same location.

   For example: mV at imposed current and pH measurements.
   If your **installed** electrode system comprises a double platinum electrode with a combined pH electrode, the electrodes must remain permanently immersed in the same beaker, in order to measure the pH correctly. This is because it is the double platinum electrode that provides the connection to the ground and not the reference electrode.
   This so-called " 3-electrode or differential measurement configuration" will stop the double platinum electrode altering the measurement at the pH electrode.
   When using this configuration for an electrode calibration, the double platinum electrode and the pH electrode must always be immersed in the same beaker.

   Important: Never remove an electrode or an electrode system without running the Installation/checking procedure first. The instrument needs to know its configuration at any time.

   For more information, refer to the Reference Manual of your titration system, keyword index: "Electrode connection - Important".

4. **Connect/Check reagent(s)**. *Refer to Short-Form Reminder no. 2*.
5. **Run the analysis** when Sunny icons are visible in the electrode and reagent tabs**.**
6. **Run an electrode calibration** when a Stormy icon appears in the electrode tab.
7. **Run a reagent calibration** when a Stormy icon appears in the titrant tab.
8. If you are unable to display the "Run" command due to the presence of Cloudy/Stormy icons in the Reagent and Electrode windows, **activate the "Check" command**. The Titration Manager will automatically guide you through the necessary operations required to solve the problem(s).

Run electrode calibration

Refer to Short-Form Reminder no. 4.

1. Select the method.
2. Install the electrode group.
3. Enter the `Electrodes` window.
4. Select **1** `Calibrate electrode`. Press ✓ to select the electrode to be calibrated from the proposed list.
5. Press **1** to start the calibration.

Run reagent calibration

Refer to Short-Form Reminder no. 5.

1. Select the method.
2. Install the reagent to be calibrated.
3. Install the electrode group to be used to perform the calibration.
4. Enter the `Reagents` window.
5. Select **1** `Calibrate/Enter titre`. Press ✓ and select the reagent from the proposed list.
6. Press **1** to start the calibration.

Run method

Refer to Short-Form Reminder no. 6.

1. Select the method in the `Method library`.
2. Install the electrode then the reagent groups to be used to perform the analysis.
3. Display the Main window.
4. Press **1** to start the analysis.

Run direct measurement

Refer to Short-Form Reminder no. 8.

1. Select the method.
2. Install the electrode group to be used to perform the measurement.
3. Prepare the sample solution and place on the sample stand.
4. Display the `Electrodes` window.
5. Press **5** to start the measurement.
6. Select the electrode in the list of connected electrodes. You can stop or start stirring by pressing **1**.

Run manual dosing

Refer to Short-Form Reminder no. 10.

1. Select the method.
2. Install the electrode group to be used to perform the measurement (if measurements are to be done).
3. Install the reagent group to be used to perform the manual dosing.
4. Prepare the sample solution and place on the sample stand.
5. Display the `Reagents` window and press **5**.
6. Select the reagent in the list of installed reagents and select the electrode in the list of connected electrodes (if measurements are to be done).
7. Enter an increment size, increment speed and maximum volume to be dosed.
8. Select the type of measurement to be performed (pH, mV, mV (i>0) or no measurement).
9. Press **1** to start.

5. Viewing data

How to access?

The GLP-Archives (Good Laboratory Practice) command is available in each window:

- `Main`: press **5** to access,
- `Reagents`: press **6** to access,

  `Electrodes`: press **6** to access.

The `GLP-Archives` window displays the method, reagent or electrode ID with the expiry date (reagent) and the installation date (electrode).

Press ✓ and enter the result number from where you want to start visualising the results. Example: result no. 9 out of 26 results stored for the method selected.

Press **1** to consult.
The following pages, give a summary of the information available in the `Main`, `Electrodes` and `Reagents` windows.

Press **2** to consult the global variables.
Refer to the last page of this chapter.

Sample results

The last 200 sample results are saved in the archives.
Once you have selected the method and the result (see previous page), the following data are displayed:

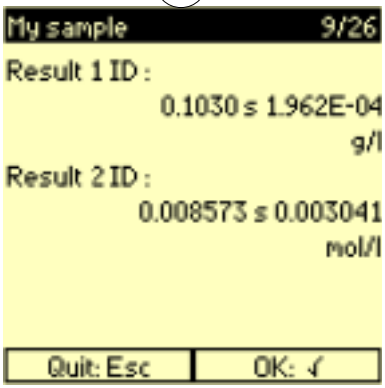
Result no. 9 / 26

26 is the number of results saved for the selected method.

Result no. 10 / 26

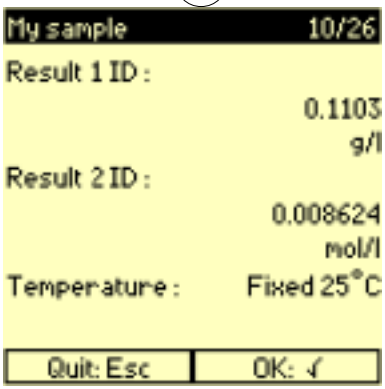
Scroll the results.
The results can be: Test results (Rx) or Average ± standard deviation calculated on several tests of the same sample. "TIM" (or "SAC") means that a TIM (or SAC) method has been run. "CPL, TIM" (or "CPL, SAC") means that the method run belongs to a coupled method.

1



Mean and standard deviation calculated on three R1 (and R2) accepted test results.

1

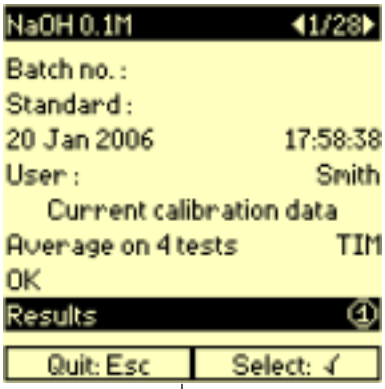


R1 and R2 = result of test no. 3 (test accepted).

Reagent calibration results

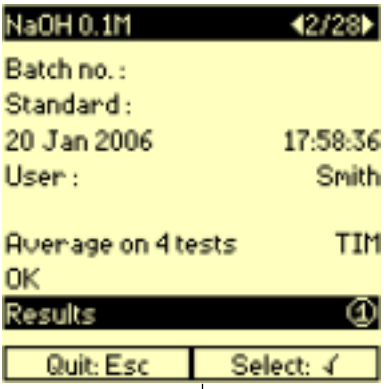
The last 100 reagent calibration results are saved in the archives.
Once you have selected the reagent then the result (see first page of this chapter), the following data are displayed:

Result no. 1 / 28



28 is the number of results saved for the selected reagent.

Result no. 2/ 28



Scroll the results.
The results can be: reagent titre entered by the operator, test performed on a standard, mean calculated on several tests performed using the same standard or the current calibration data. "TIM" (or "SAC") means that a TIM (or SAC) method has been run.

1

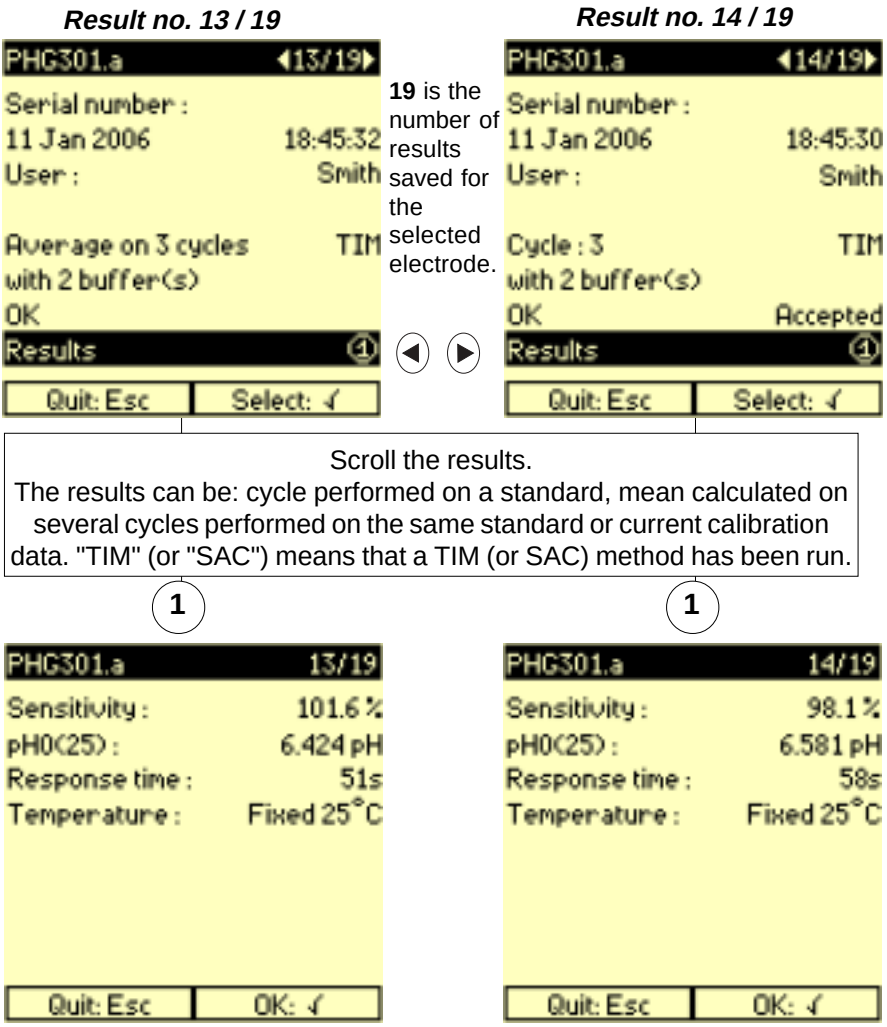
Results of the current calibration

1

Mean and standard deviation calculated on 4 tests performed and accepted on the same standard.

Electrode calibration results

The last 100 electrode calibration results are saved in the archives. Once you have selected the electrode then the result (see first page of this chapter), the following data are displayed (for a pH calibration):



Mean calculated on 3 cycles performed and accepted. Each cycle has been run using 2 buffer solutions.

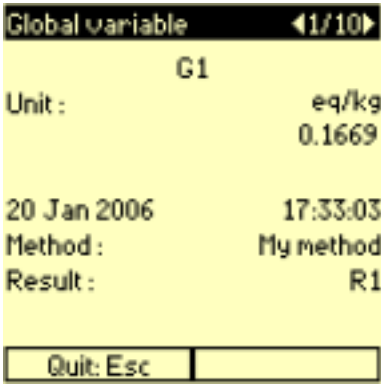
Result of cycle no. 3 (cycle accepted). This cycle has been run using 2 buffer solutions.

Global variables

To view the G1 to G10 global variables:

- Enter the `Method/sequence` window.
- Press **5** (GLP-Archives).
- Press **2** (Global variable).

Global variable G1



Global variable G2

Scroll the G1 to G10 global variables.

6. Printing data

✶ IMPORTANT ✶

Before printing, it is necessary to perform the following:

1. **Enter the Setup window**: press **Stop** 3 seconds in the `Main` window.

2. **Select the Printer**

   Press **1**.
   In `Configuration`, select `Printer = 80 columns` and `Format = Listing` or `Page by Page`.

3. **Enter User ID** (if required)

   In `Configuration`, select `User ID = Yes`. You will be prompted to enter a user ID at the start of a run method. This ID will appear on the printouts.

4. **Customise the printout** (if required)

   In `Configuration`, press **3**.
   In `Customise`, enter the name of your workstation (max. 4 lines of 32 characters). This information will appear as a header at the start of the printout.

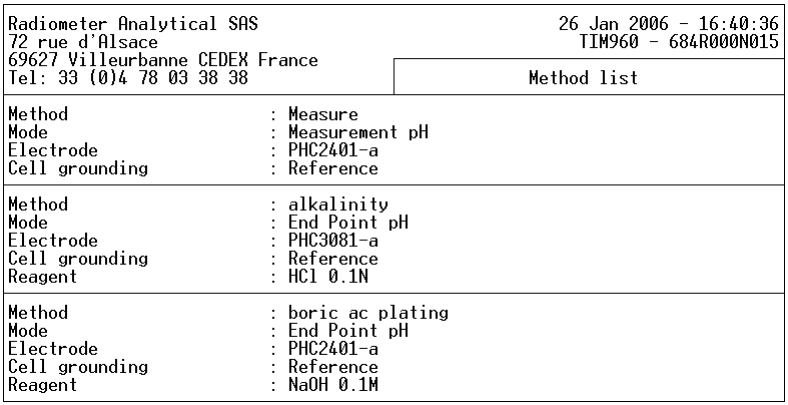
5. **For automatic printout - select a condensed or detailed printout**

   In the `Printouts` screen of the Edit method/reagent/electrode, select `Detailed = High` to obtain a full detailed printout. Select `Low` for condensed printout.

Manual printouts

Method library

Press **Print**, in the Main window to give you an overview of the methods available in the method list.



Radiometer Analytical SAS
72 rue d'Alsace
69627 Villeurbanne CEDEX France
Tel: 33 (0)4 78 03 38 38

26 Jan 2006 - 16:40:36
TIM960 - 684R000N015

Method list

Method	: Measure
Mode	: Measurement pH
Electrode	: PHC2401-a
Cell grounding	: Reference
Method	: alkalinity
Mode	: End Point pH
Electrode	: PHC3081-a
Cell grounding	: Reference
Reagent	: HCl 0.1N
Method	: boric ac plating
Mode	: End Point pH
Electrode	: PHC2401-a
Cell grounding	: Reference
Reagent	: NaOH 0.1M

Reagent library

Press **Print**, in the `Reagent` window to give you an overview of the reagents available in the reagent list.

Electrode library

Press **Print**, in the `Electrode` window to give you an overview of the electrodes available in the electrode list.

Edit method data

In the Main window, press **4** `Method library` then **Print** to give you an overview of the parameters of the current programmed method. These are the parameters entered in the `Edit method` screen (press **2** to access).

```
Radiometer Analytical SAS                              26 Jan 2006 - 11:48:19
72 rue d'Alsace                                          TIM960 - 684R000N015
69627 Villeurbanne CEDEX France
Tel: 33 (0)4 78 03 38 38                    Method : OP QUALIF. (EP)

Mode              : End Point           Measure           : pH
QC sample         : No                  Blank             : No
Temperature       : T201 O.Q.           No. of tests      : 3
Cell grounding    : Reference

   PARAMETERS
Electrode         : PHC2011 O.Q.        Reagent           : HCl O.Q. 0.1N
Predose until     : 0.0 ml              Start timer       : 00min45s
Maximum volume    : 25.0 ml             Direction         : Decreasing pH
Minimum speed     : 0.20 ml/min         Maximum speed     : 5.00 ml/min

Auxiliary output  : No
Addition          : No
Back titration    : No

End point no. 1   : 3.900 pH
EP delay          : 00min10s            Proportional band : 3.000 pH

     SAMPLE
Dilution          : No
Sample amount     : 85.000 mg

     RESULT
No. of results    : 1                   No. of equations  : 0
Accept. criteria  : Yes                 No. of digits     : 4
Results factor    : No

            Result R1
Result unit       : %                   Molar weight      : 105.990 g/mol
Reaction          : 1Smp + 2Titr ->
Minimum value     : 99.000              Maximum value     : 101.000
Global variable   : No

    PRINTOUTS
Title             : Analysis bulletin
Detailed level    : Medium
Curve             : Yes
```


Edit reagent data

Press **4** `Reagent library` in the `Reagent` window then **Print** to give you an overview of the parameters of the current programmed reagent. These are the parameters entered in the `Edit reagent` screen (press **2** to access).

Edit electrode data

Press **4** `Electrode library` in the `Electrode` window then **Print** to give you an overview of the parameters of the current programmed electrode. These are the parameters entered in the `Edit electrode` screen (press **2** to access).

Automatic printouts

The **Print** key is inactive during a titration, pH/mV measurement, electrode or reagent calibration.

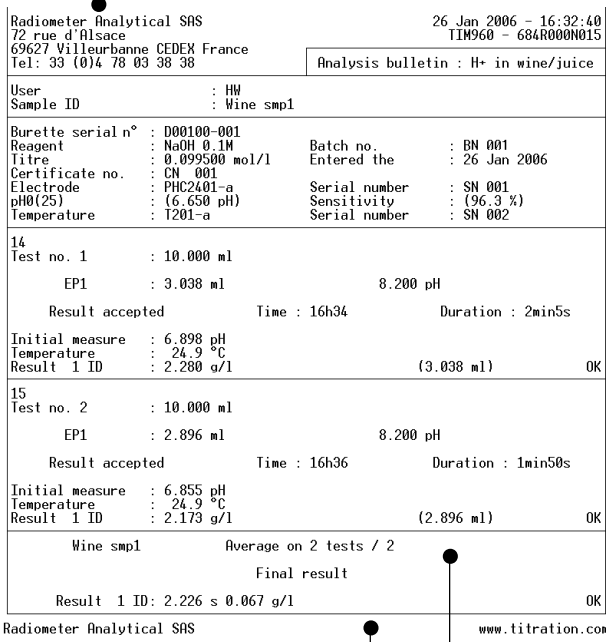
The results obtained during a "Run" are printed automatically.

Depending on the option selected for `Detailed` in the Edit method/ reagent/electrode - Printout window, you will obtain different types of printouts.

Example of a printout for a titration

Header: information entered in the `Customise` screen of the Setup window.

Title of report: entered in Printouts screen during method editing



```
Radiometer Analytical SAS                          26 Jan 2006 - 16:32:40
72 rue d'Alsace                                      TIM960 - 684R000N015
69627 Villeurbanne CEDEX France
Tel: 33 (0)4 78 03 38 38          Analysis bulletin : H+ in wine/juice

User                        : HW
Sample ID                   : Wine smp1

Burette serial n°  : D00100-001
Reagent            : NaOH 0.1M          Batch no.          : BN 001
Titre              : 0.099500 mol/l     Entered the        : 26 Jan 2006
Certificate no.    : CN  001
Electrode          : PHC2401-a          Serial number      : SN 001
pH0(25)            : (6.650 pH)         Sensitivity        : (96.3 %)
Temperature        : T201-a             Serial number      : SN 002

14
Test no. 1         : 10.000 ml

       EP1         : 3.038 ml                    8.200 pH

     Result accepted            Time : 16h34          Duration : 2min5s

Initial measure    : 6.898 pH
Temperature        :  24.9 °C
Result  1 ID       : 2.280 g/l                  (3.038 ml)          OK

15
Test no. 2         : 10.000 ml

       EP1         : 2.896 ml                    8.200 pH

     Result accepted            Time : 16h36          Duration : 1min50s

Initial measure    : 6.855 pH
Temperature        :  24.9 °C
Result  1 ID       : 2.173 g/l                  (2.896 ml)          OK

        Wine smp1          Average on 2 tests / 2

                               Final result

      Result  1 ID: 2.226 s 0.067 g/l                                 OK

Radiometer Analytical SAS                                 www.titration.com
```

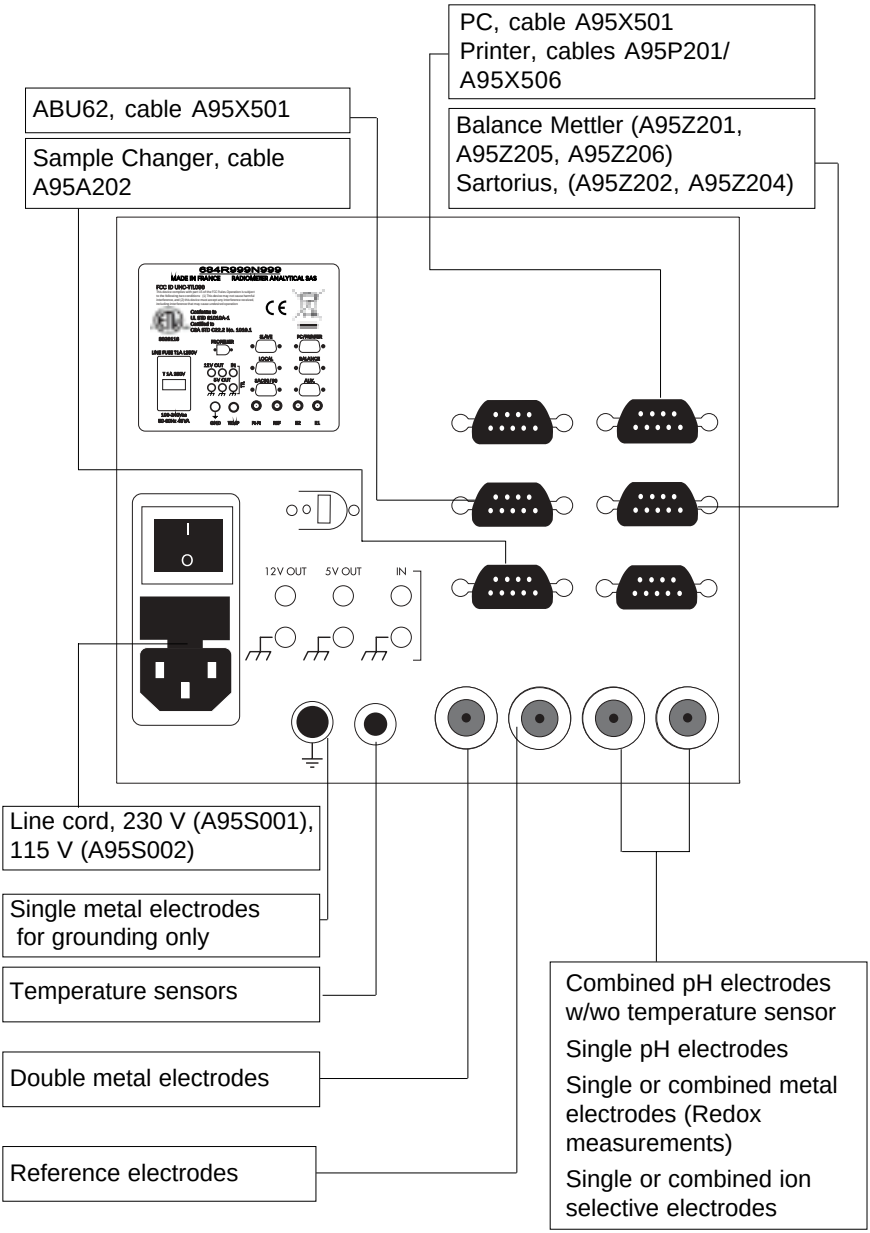
Foot note: automatically appears at the end of all printouts

Analysis ID: User ID and Sample ID entered at the start of the titration (if option selected during editing)

Titration results: obtained at the end of the analysis

Calibration data: of the electrode and reagent used to perform the titration

7. Connection of peripherals



8. Maintenance

Cleaning

The Titration Manager requires minimum maintenance. The exterior surface can be cleaned with tepid water and wiped dry with a soft cloth. Never use another solvent unless you have first consulted your Radiometer Analytical representative

Transporting the instrument

Always use the packaging supplied by the manufacturer.

IMPORTANT!

Remove the metal rod before transporting the instrument.

Never pick-up or carry the instrument by the metal rod.

Servicing

DO NOT ATTEMPT TO SERVICE THIS PRODUCT YOURSELF, except as noted in the Reference Manual. For servicing, please contact your **Radiometer Analytical service representative** at the address given below:

RADIOMETER ANALYTICAL SAS
72, rue d'Alsace
69627 Villeurbanne CEDEX - France
Tel.: +33 (0) 4 78 03 38 38
Fax: +33 (0) 4 78 03 38 27
E-mail: radiometer@nalytical.com

or your local service representative:

_____
_____
_____
_____
_____

International Standards

RADIOMETER ANALYTICAL SAS
72 rue d'Alsace 69627 Villeurbanne Cedex, France
E-mail : radiometer@nalytical.com Web : www.radiometer-analytical.com
Tél. : +33 (0)4 78 03 38 38 - Fax : +33 (0)4 78 68 88 12

CE Marking
DECLARATION OF CONFORMITY

We, **Radiometer Analytical SAS**,

declare under our sole responsibility that the Potentiometric Titration Workstations TIM9xx, including TIM960, TIM965, TIM980 and ABU62

are in conformity with the provisions of:

Radio and Telecommunications equipment directive 99/5/EEC, dated 9/3/1999,
Low voltage directive 73/23/EEC, dated 19/2/73
EMC directive 89/336/EEC, dated 3/5/1989, 92/31/EEC, dated 28/4/1992,
CE harmonisation directive 93/68/EEC, dated 22/7/1993,

following standards and severity levels of:

EN 61010-1, 1995
EN 300330-1, 1999,
ETSI TR102 070, **2002**, and **EN 301 489, 2001**,
CISPR16-1, 1999, and **EN 61326-1**, 1997,
EN 55022, 1998, class A,
EN 61000-3-2, 2000, **class A** and **EN 61000-3-3**, 1995,
EN 61000-4-2, 1995, **level 2** (4kV) with contact discharges and **level 3** (8kV) with air discharges,
EN 61000-4-3, 2002, **level 2** (3V/m),
EN 61000-4-4, 1995, **level 2** (1kV) on AC power line,
EN 61000-4-5, 1995, **level 2**
EN 61000-4-6, 1996, **level 2** (3V),
EN 61000-4-11, 1994,

after tests and qualification of our products, regarding "Radio" and "EMC" directives, performed by:
AEMC Lab, Sassenage (France) independent laboratory, **Cofrac** accredited under the number 1-0805, with a **Radio qualification report no. R0603066R-E-C** and a **EMC qualification report no. R0603066C-E-C**, dated June 15, 2006 which attests **the conformity** of the TIM9xx workstations,

and tests and qualification of the product, regarding "Low Voltage" directive, attested by our company, according to the self-assessment procedure (article 10.1), recommended for the CE marking, as these products are UL / CSA certified.

Year of the first CE marking: **2006**.

Villeurbanne, July 20, 2006
RADIOMETER ANALYTICAL SAS

Georges RIVOIRARD
Quality Manager

Ref. Document : A090B09A

The Titration Manager complies with the following standards:

UL 61010A - 1

CAN / CSA C22 2 N° 1010.1 - 92.

The Titration Manager TIM9xx complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:
(1) This device may not cause harmful interference, and
(2) this device must accept any interference received, including interference that may cause undesired operation.

See "Compliance with FCC rules, part 15 - Information to the user" on page 5.