

Model 926

Chloride Analyser

Operator's Manual

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1

Introduction

1.1 Introduction

The M926 is a direct reading, digital chloride meter. It is designed for fast and accurate determinations of chloride levels in industrial samples.

Sample volume is 0.5ml and results are displayed on a digital readout in mg/l (milligrams per litre) or mg% (milligrams percent) salt as Sodium Chloride.

This manual presents complete instructions for setting up and using the M926. A short time spent familiarising yourself with these instructions will be more than repaid in satisfactory operation.

The M926 is intended for use by persons knowledgeable in safe laboratory practices. If the M926 is not used in accordance with these instructions for use, the protection provided by the equipment may be impaired.

A Service Manual is available as an optional extra, for use by appropriately qualified technical personnel. Please refer to Section 10.

1.2 Summary of the Test

The Sherwood Model 926 is used for the determination of chloride ions. It is an instrumental analogue of "Argentimetry", the traditional titrimetric methods using Silver Nitrate reagent. Like these classic methods it relies on the chemical formation of the very insoluble salt, Silver Chloride. The importance of chloride determination has been realised for well over a century, with many variations and changes being made to the techniques in order to improve the detectability and selectivity. Research into the analysis of chloride was conducted by Gay-Lussac (1832), Levöl (1853), Mohr (1856) and Volhard (1874) and their findings have proven to be the basis of the methods, which are still in common use today.

Introduction

continued

1.3 Reagents

The following Sherwood Scientific solutions are recommended for use with the M926. Ordering information is given in Section 10.2.

NOTE All reagents contain preservatives where required.

Standard Solution is 200 mg/l as Sodium Chloride.

Combined Acid Buffer Solution is a support electrolyte consisting of a mixture of Acetic and Nitric acids which maintain the correct pH for the complete cycle of titrations, and a colloid to prevent precipitation.

WARNING Acid Buffer is corrosive – avoid contact with skin. Wash exposed areas with water.

Dilution

No dilution is required for Sherwood Scientific reagents.

Storage

Solutions should be stored away from direct sunlight in a cool place, preferably with an ambient temperature below 25°C (77°C). Do not use solutions after the expiration date shown on the bottle. Do not return decanted contents to the original bottle.

Purification

No purification or treatment is required when using Sherwood Scientific reagents.

Instability

Never leave bottles of Standard Solution uncapped, as prolonged exposure to the atmosphere will affect the solutions concentration.

2

Installation

2.1 Services Required

An a.c. supply at 100V, 200V, 220V or 240V $\pm 10\%$, at 50 to 60Hz, is required for the M926. The voltage is preset during manufacture and the value is shown on the serial plate attached to the instrument.

CAUTION If the voltage setting is not correct for the local supply, please contact your Sherwood Scientific distributor.

2.2 Unpacking

Upon receipt, the M926 should be removed from its carton and inspected for damage. Contact your Sherwood Scientific representative if any items are missing or damaged.

1. Lift out the accessory tray.
2. Lift the instrument out of the polythene cover on to a bench.
3. Check the instrument and all the items in the carton for signs of damage. Check items received against the following list and notify your Sherwood Scientific representative if any discrepancies are discovered.

IMPORTANT Quantities shown in the following list are those supplied with a new instrument. DO not re-order from this list; instead refer to Section 10 of this manual.

Part No.	Description	Quantity
100 626	Fuse, 160mA, antisurge (for spares use)	2 (230V units)
001 48 350	Fuse, 315mA, antisurge (for spares use)	2 (115V units)
001 42 498	Supply lead a.c.	1
001 56 203	Chloride Standard Solution, 200mgCl/l, 1 x 100ml	1 bottle
001 56 205	Silver Electrode Polish	1 vial
001 56 206	Combined Acid Buffer Solution, 1 x 500ml	1 bottle
925 11 002	1 x Cathode, 2 x Detecting Electrodes, set of 3	1 set
925 11 003	Anodes, pack of 3	1 pack
925 11 009	Beaker, borosilicate glass, graduated at 10ml	2
925 14 001	Stirrer	1
	Chloride Meter	1
926 91 002	Operators Manual	1

Installation

continued

2.3 Assembly

CAUTION Check the voltage shown on the serial label. If it is not correct for the local supply, contact your Sherwood Scientific distributor.

1. Fit the two shorter, sleeved electrodes into the two rear positions on the underside of the electrode head, item 3, figure 2.1. Ensure both electrodes are pushed firmly into their sockets behind the protective rubber boots.

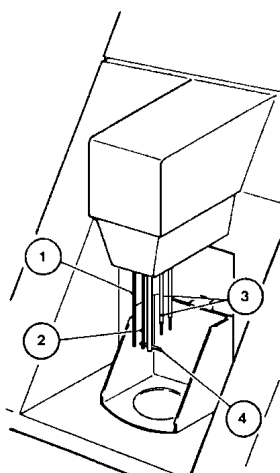


Figure 2.1 **Electrode Head**

1. Anode, 2. Cathode, 3. Sense electrodes, 4. Stirrer.

2. Insert the stirrer through the stirrer hole and push it firmly into its coupling, as shown in figure 2.1, item 4.
3. Insert the cathode (unsleeved short electrode) through the lefthand hole and push it firmly into its socket, as shown in figure 2.1, item 2.
4. Fit an anode (70mm long electrode) through the remaining hole into its socket.
5. Check that the three shorter electrodes are all fully inserted, and then adjust the position of the anode so that all four electrodes are the same length.
6. Position the M926 so that there is clear access to the mains supply switch.
7. Where necessary, fit a suitable plug to the a.c. supply lead. Follow the plug manufacturers instructions.
8. Refer to Section 5 of this manual for detailed operating instructions.

3

Principles of Operation

3.1 Description

An accurately measured volume of sample (0.5ml) is added to an acid buffer. The M926 automatically titrates chloride ions by passing a known constant current between two silver electrodes which provides a constant generation of silver ions. These silver ions combine with the chloride in the sample and form silver chloride, which is held in suspension by the colloid stabiliser. During the titration period the digital readout is updated approximately every 0.3 seconds. During these periods the number of silver ions introduced into the sample combine with one unit measurement of chloride. When all the chloride has been precipitated as silver chloride, free silver ions begin to appear and the solution conductivity changes. This change is detected by the sensing electrodes and the readout is stopped, displaying the results directly in milligrams of chloride per litre or milligrams % salt. Another sample may now be added to the same acid buffer and the cycle repeated. The digital display is held until starting another cycle, when it is automatically reset to zero.

4

Performance Characteristics and Specifications

4.1 Range

10 to 999 mgCl/l or 2 to 165mg% salt.

4.2 Accuracy

Results will be within ± 2 mg/l (at the 100mg/l level) of the values obtained by standard wet-chemical methods after allowing for pipetting errors.

4.3 Linearity

Results will be within ± 3 mg/l in the range 50 to 299 mg/l.

4.4 Reproducibility

The values obtained from five consecutive titrations of a nominal 200mg/l solution will be within 3mg/l of the mean value.

4.5 Stability

The calibration level (mean of five titrations of a standard solution) will change by less than ± 2 Least Significant Digits over the life of any silver anode.

4.6 Response Time

A stable reading will be displayed within 36 seconds of depressing the 'Titrate' button, at a concentration level of 10 mgCl/l.

4.7 Measurement Capacity

Five industrial samples at 0.5ml volume, per reagent change.

4.8 Samples

Type

Chloride in solution, having low ionic strength, neutral pH and free of silver halides, silver reactive constituents (other than chloride), solid mater and high levels of dissolved solids.

Presentation

By pipette directly into the beaker of reagents.

Volume

0.5ml

Performance Characteristics and Specifications

continued

4.9 Readout

Three digit LED display, reading up to 999. For definitions of the display codes refer to Section 5.1 of this manual.

4.10 Warm Up

Five minutes warm up is required to meet the stated specification.

4.11 Environmental Conditions

Operation

Temperature range	+10°C to +35°C
Maximum relative humidity	85% at +35°C (non condensing)

Transportation

Temperature range	-40°C to + 45°C
Maximum relative humidity	95% at +45°C

Compliance with the stated specification will be unaffected by a change in ambient temperature up to 4°C per hour, provided the operating temperature range is not exceeded.

Installation Category

Installation category 1.

4.12 Power requirements

Voltage

An a.c. supply at 100V, 115V, 200V, 220V or 240V $\pm 10\%$, 50 to 60Hz.

NOTE If you have a 230V supply, use the 240V setting.

Power

Fuse rating	220V/240V	2 x 160mA
	100V/115V/200V	2 x 315mA
VA rating		10 Volt Amperes.

4.13 Size

Width	200 mm (7")
Depth	250mm (9.8")
Height	315mm (12.4")

4.14 Weight

3.8kg (8.4lbs).

5

Operating Instructions

5.1 Controls and Indicators

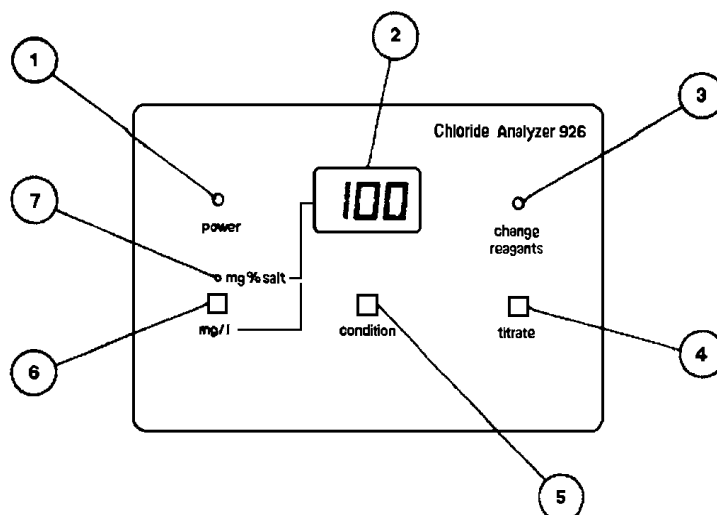


Figure 5.1 Front Panel

1. Power indicator, 2. Digital readout, 3. Change reagents indicator, 4. Titrate pushbutton, 5. Condition pushbutton, 6. mg% salt pushbutton, 7. mg% salt LED indicator.

Condition

Pushbutton that when depressed initiates the conditioning cycle. The conditioning cycle must be run each time the M926 is switched on and each time the reagents are changed. The purpose of the conditioning cycle is to Titrate out any chloride present in the reagents or beaker, so that the subsequent titration is accurate. The 'condition' pushbutton also resets the sample number counter, which controls the 'change reagents' LED indicator and the E02 error code.

Titrate

This pushbutton, when depressed, initiates a titration cycle. During a titration the stirrer operates for approximately 5 seconds before the readout is set to zero. The chloride is then titrated out of the solution while the readout is incremented. When all the chloride is titrated the readout is stopped and held. The 'titrate' pushbutton is inoperative following switch on and after an E02 error code is displayed. In each case this ensures that a condition cycle is carried out first. This prevents an erroneous result on the first titration due to chloride being present in the reagents or beaker.

Operating Instructions

5.1 Controls and Indicators

continued

Mg% salt

This pushbutton selects the units in which the final reading is displayed. The M926 carries out measurements in units of mgCl/l and only calculates the final result in mg% salt. The pushbutton is inhibited until a condition cycle and the first titration cycle have been run, so the mg% salt LED indicator only illuminates after the first titration. This enables any result to be displayed in mgCl/l or mg% salt simply by selecting the alternate display mode.

Power

Green LED indicator that is illuminated when the M926 is connected to an a.c. supply and the on/off power switch on the rear panel is on.

Change Reagents

Yellow LED indicator that is illuminated when five 0.5ml samples have been titrated. A further two samples can be titrated, if required, before changing the reagents.

Display Codes

The following display codes will appear on the digital readout in place of the measured value.

Code	Indication
CCC	A condition cycle is in progress.
E01	The display has counted past 999.
E02	Reagents must be renewed. Initiated when an eighth titration is attempted after a conditioning cycle, no titration will take place.
E03	No sample present.
EEE	[In RS232 or Datagate mode] External device not connected or not switched on.

Calibrate Control

The calibration control is accessible via a hole in the righthand side panel. The calibrate control determines the speed at which the display is updated and, therefore, the final result. The adjustment procedure is detailed in Section 8.4.

Operating Instructions

continued

5.2 Rear Panel Components

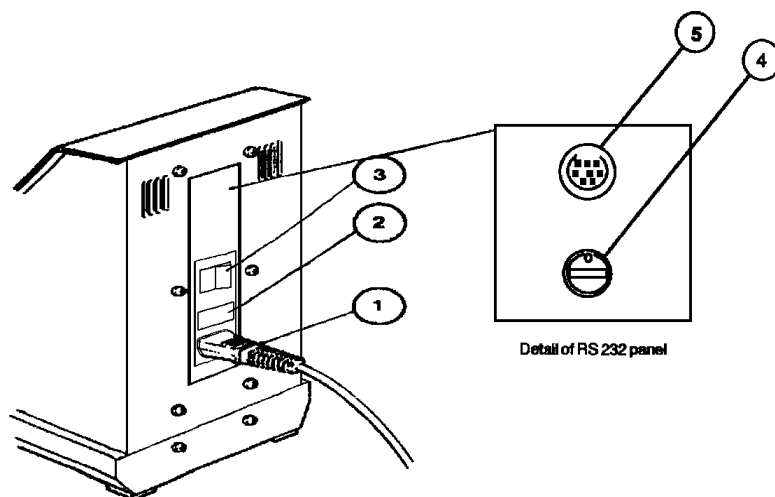


Figure 5.2 Rear Panel



IEC symbol advising user to refer to accompanying documentation.

1. **Power** Input a.c. power supply connector.
2. **Fuses** Two 160mA (230V) or Two 315mA (115V) fuses to protect the M926. Both live and neutral are fused
3. **Power switch** On/Off rocker switch that switches the a.c. line and neutral supplies to the instrument. Part of mains inlet.
4. **RS232 communications switch** Your M926 has an RS232 output fitted and this switch is used to provide the different output 'handshakes'. See Section 5.5.1.
5. **RS232 socket** Input connector for Serial Cable (926 09 051)

Operating Instructions

Rear Panel Components

continued

5.3 Calibration

1. Connect the M926 to an a.c. supply and switch on the rear panel power switch. Check that:
 - 'power', 'mg% salt' and 'change reagents' indicators are illuminated.
 - all digits on the readout are displayed in sequence from 000 through to 999.
2. Check that 'change reagents' and 'mg% salt' indicators are off when readout returns to 999.
3. The software version of the RS232 fitted to your instrument will be indicated during the power on sequence. e.g. 033 is version 0.33. See Section 5.5.4.

NOTE All three electrodes go black in use, this is normal and will not affect performance.

4. Add Combined cid Buffer to the mark in a clean sample beaker.
5. When the M926 has been switched on for 5 minutes, continue with the calibration.
6. Place the sample beaker on the platform and raise the platform, until it locates in the raised position.
7. Pipette 0.5ml of 200mgCl/l Standard Solution into the beaker.
8. Depress 'condition' pushbutton.
9. Immediately CCC will be displayed on the readout, indicating that conditioning is in progress.
10. When the stirrer stops, pipette 0.5ml of 200mgCl/l Standard in to the beaker.
11. Depress 'titrate' pushbutton.
12. Check that 'mg% salt' indicator is off and the reading is 200 ± 3 . If reading is satisfactory, continue with Section 5.4, Operation. If E01 is displayed (reading above 999) check that the pipette is dispensing 0.5ml. If the reading is outside the specification, repeat from paragraph 10. If the second reading is not within the stated range, but is reproducible to ± 3 refer to Section 8.4 and recalibrate the instrument. If it is not reproducible, refer to Section 9, Troubleshooting.
13. If you are using a printer or computer with your M926 then the result of the calibration will be printed as e.g. Sample 001 = 200mg/l. (All values appearing on the display will be printed as Sample... in sequential order even though they may be standards. See Section 5.5.3.

Operating Instructions

continued

5.4 Operation

WARNING Do not attempt sample determinations unless the calibration procedure detailed in Section 5.3 has been successfully carried out.

1. Keeping the electrodes immersed, pipette the 0.5ml of sample into the beaker and depress the 'titrate' pushbutton.
2. When the stirrer stops, note the reading on the display. If the results are required in mg% salt depress the pushbutton so that the 'mg% salt' indicator is illuminated.
3. Repeat paragraphs 1 and 2 for further samples.

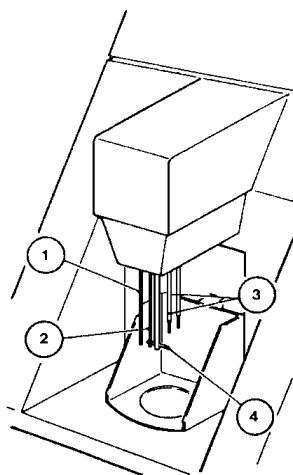


Figure 5.3 Electrodes and Electrode Head.

1. Anode, 2. Cathode, 3. Sense electrodes, 4. Stirrer.

4. When the 'change reagents' indicator comes on, you will have titrated 5 samples. If only two further samples are to be run, continue with paragraphs 1 and 2. However, if more than two samples are to be run, continue with paragraph 6.

IMPORTANT If a third sample is added after 'change reagents' is illuminated it will be lost as code E02 will be displayed.

5. If code E02 is displayed continue with paragraph 6.
6. Lower beaker and empty out contents. Rinse with deionised water and dry with clean tissue.
7. If necessary, adjust the vertical position of the anode, item 1, figure 5.3, so that it is the same length as the other electrodes.
8. Continue as detailed in Section 5.3, paragraph 3.
9. When determinations are complete, remove the beaker and allow the electrodes to dry naturally.

Operating Instructions

Operation

continued

5.5 RS232 Output, Printing and Datagate

The M926 has been improved with the addition of an RS232 output, which enables results to be sent to external printers, such as the Sherwood portable printer (473 56 903/ 4 or 5); the new Datagate Salt Analysis System (926 29 015); or other devices with serial inputs.

1. The communications switch (see figure 5.2, item 4) must be set to one of the following positions
 - 0 No external device in operation or connected.
 - 1 RS232 in use and cable connected to external device.
 - 2 Datagate communications via Intelligent Interface.
2. If you wish to use an external device then insert the small end of the Serial Cable (926 09 051) into the socket on the rear of the M926 (figure 5.2, item 5); insert the 9way plug at the other end of the serial cable into the serial input socket of the external device, a printer, the marked input on the Datagate Intelligent Interface or a computer serial interface.
3. **Set the baud rate for the external device to 9600.** (This will already be set for the Sherwood printer and Datagate).
4. Direct printing from the Model 926.
Switch on the external device then switch on the M926. The power up sequence contains the software version, which is indicated in the third set of displays as e.g. 033, which is version 0.33. The printer will print '926 Analyser (V0.33)'.

If the communication switch is set '1' and an external device is not connected or is not switched on then the error message 'EEE' alternates with '000' after the initial sequence is finished.

5. Perform the calibration and measurement as described in Sections 5.3 and 5.4. After each titration the printer will print the value displayed as: -
'Sample 001 = 200mg/l'
'Sample 002 = 202mg/l'

During and after the conditioning there is no signal to the printer, as conditioning can be necessary during the measurement run of samples, the number sequence is thus interrupted.

The number sequence on a printer can be reset to '001' only by switching off the M926 and reconditioning.

5.6 Datagate LIMS.

Datagate is a new system enabling the integration of the M926 Analyser with a Laboratory Balance and Barcode Reading System all connected to a single serial port of a PC. The connections are made through an Intelligent Interface which as well as handling the connections of the various devices guides the analyst through the measurement by means of indicator lights.

Full information on connecting and using Datagate is supplied with the Datagate Accessory Pack (926 29 015).

6

Operating Precautions and Hazards

6.1 Operating Precautions

1. The electrodes will go black during use; this will not affect the performance. Only if the 926 will not measure a Standard or sample will it be necessary to clean the electrodes.
2. The M926 requires a warm up period of five minutes to meet the stated specification.
3. Reproducibly accurate results are dependent on reproducible pipetting from sample to sample and from aqueous standard to sample. If the M926 is calibrated on an aqueous standard and reproducibly low results are obtained with samples, hold up in the pipette should be suspected and a rinse out technique employed.
4. Always dispense standard solution into a small beaker or cup. Do not take standard solution directly from the bottle with a pipette, as the standard could become contaminated. Never pour standard solution back into the bottle once it has been dispensed. Ensure that only genuine Sherwood Scientific reagents and supplies are used with the M926. Do not use solutions after the expiry date shown on the bottle.
5. Samples should have low ionic strength, neutral pH and be free of sulphide, sulphhydryl silver halides, silver reactive substances (other than chloride), solid matter and high levels of dissolved solids.
6. Do not leave the electrodes immersed in reagents when the instrument is not in use.
7. Use only the beakers supplied with the M926.
8. It is recommended laboratory practice to wear gloves when handling samples. Gloves will also afford protection against the Combined Acid Buffer and against accidental static damage to the electrodes.

6.2 Hazards

1. All electrical equipment is potentially hazardous. Never remove covers from the M926 without first ensuring that it is isolated from the a.c. supply.
2. Do not move the M926 when there is a beaker containing Combined Acid Buffer in position on the sample platform.

7

Quality Control

7.1 General

The M926 Chloride Analyser has been designed to provide fast and accurate determinations of chloride in industrial solutions.

The latest Sherwood Scientific technology has been incorporated into the M926 to ensure the validity of the final results. However, the results can be affected by factors other than instrument malfunction, such as sample handling and storage. Sherwood Scientific recommend therefore, that a Quality Control programme is set up to monitor instrument and operator performance. Because the needs of each laboratory are different, due to size of workload, number of hours worked, statutory regulations, etc., no attempt has been made to formulate a rigid programme. Instead, in Section 7.2 there are a number of suggestions that will be helpful in specifying a procedure to suit your particular requirements.

The following references are recommended for further information on Quality Control.

Pearson, E.S., British Standard 600:1935.
Westgard, J.O., Carey, R.N., and Wold, S., Clinical Chemistry 20'825 (1974).
Barnett, R.N., American Journal of Clinical Pathology, 50,671 (1968).
Tonks, D B., Canadian Journal of Medical Technology, 30,38 (1968).
Natrella, M.G., Experimental Statistics, National Bureau of Standards Handbook 91, U.S. Government Printing Office, Washington D.C., 1963, pp4.1 to 4.7 and Table A-21, p T-36.

IMPORTANT If you report your results to a Quality Control Scheme ensure that they are informed of the change in method, i.e. Sherwood Scientific 926 Chloride Analyser.

7.2 Quality Control Checks

The following notes are designed to assist you in formulating a Quality Control programme.

1. Include a Quality Control at least once every 40 samples, following the recommendations of the QC Manufacture.
2. Check abnormally high and low values daily.
3. Routinely include aqueous Standards that contain chloride concentrations that are different to the Standard concentration used for calibrating the M926.
4. Ensure day-to-day variations do not exceed acceptable values.
5. Reproducibility should be checked on 20 replicate samples on a routine basis.

8

Maintenance

8.1 General

The M926 has been designed to reduce the need for regular maintenance to an absolute minimum. The maintenance required is detailed in Section 8.2, Daily. Refer to Section 10 for ordering information and catalogue numbers of parts used for daily maintenance, which are listed under *Equipment Required*.

It is recommended that at the end of the warranty period, the customer opens a Maintenance Contract with Sherwood Scientific. This contract is designed to keep your instrument in first class condition by ensuring that all operating systems are routinely checked and adjusted. Further details of the Maintenance Contract Scheme can be obtained from your Sherwood Scientific Representative.

8.2 Daily

Equipment Required

Disinfectant Solution e.g. glutaraldehyde,
electrode polish,
1 x anode,
1 x cathode,
2 x detecting electrodes.

1. Check that all four electrodes are straight and parallel and the anode is the same level as the other electrodes. If necessary, refer to Section 8.3 to clean, adjust or replace the electrodes.
2. Wipe down the sample area with disinfectant solution.

Maintenance
continued**8.3 Electrode Cleaning and Replacement****Equipment Required**

Electrode polish, soft cloth, 1 x cathode, 1 x anode and 2 x detecting electrode.

1. Remove the four electrodes by withdrawing them downwards from the electrode head.

Note that the anode (item 1, figure 8.1) is longer than the other three electrodes.

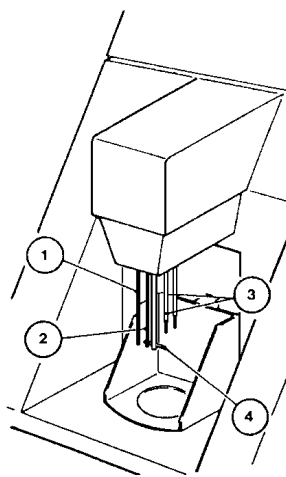


Figure 8.1 Electrodes and Electrode Head

1. Anode, 2. Cathode, 3. Sense electrodes, 4. Stirrer.

2. If the length of the anode is less than 57mm discard it and fit a replacement.
3. Place a little Sherwood Scientific Electrode Polish on a soft cloth and gently rub the exposed parts of the electrodes until they are clean and bright.
4. Refit the electrodes; ensure that with the cathode and sense electrodes fully inserted, the anode is adjusted to the same length.
5. Place a beaker of deionised water on the sample lift and immerse the electrodes.
6. Carry out three condition cycles.
7. Remove the beaker and wipe the electrodes with a clean soft cloth.
8. Carefully inspect the electrodes to ensure that they are clean. If they are not repeat paragraphs 1 to 7. If they are still not clean fit replacements, ensuring that they are fully inserted.
9. Check that all the electrodes are straight and parallel, adjusting as necessary.
10. Calibrate the instrument as detailed in Section 8.4.

Maintenance
continued**8.4 Calibration Procedure****Equipment Required**

0.5ml pipette, 200mgCl/l Standard Solution, Combined Acid Buffer, Insulated flat blade screwdriver (3mm ($\frac{1}{8}$ ")).

1. Refer to Section 5.3 and carry out paragraphs 1 to 11, selecting mgCl/l, i.e. *mg% salt* indicator off, when titration is complete.
2. Carry out five titration's using 200mgCl/l Standard Solution, noting each reading. If the five readings are not reproducible to within ± 3 , refer to Section 9, Troubleshooting.
3. Calculate the mean of the five readings, which should be between 198.5 and 201.5 mgCl/l. If it is, then no further action is required. If not continue with paragraph 4.
4. Using a screwdriver adjust the *count adjust* control through the hole in the side panel, item 1, figure 8.2. If the reading is low adjust the control clockwise, if high adjust the control counter-clockwise. The sensitivity is approximately a change of 16mgCl/l for one complete rotation.

NOTE The Sherwood Scientific Model 926 uses an absolute method of operation and is calibrated at the factory. Recalibration should only be necessary after changing internal electronic components.

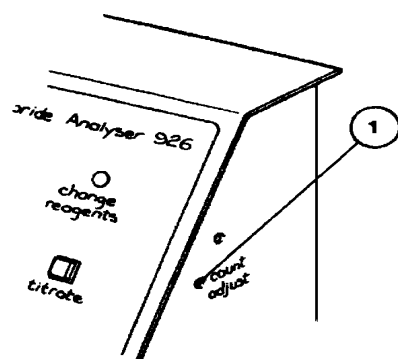


Figure 8.2 Calibrate Control

1. Count adjust control.

5. Repeat paragraphs 2 to 4 until the mean result is within the range 198.5 to 201.5.

9

Troubleshooting

9.1 Error Codes

- E01** The instrument has counted past 999. Check the pipette is dispensing 0.5ml.
- E02** Seven samples have been run. Change the reagents.
- E03** No sample present.
- EEE** (In RS232 or Datagate mode) External device not connected or not switched on.

9.2 Power LED not illuminated.

Check that the instrument is connected to a working a.c. supply, and that the power switch is in the on position.

Check the plug fuse and replace if necessary. Check the instrument fuses and replace if required, refer to Section 5.2.

If the fault persists contact your Sherwood Scientific distributor.

9.3 Condition or titrate cycle inoperative.

Check the beaker contains chloride; add 0.5ml of standard solution if necessary.

Clean or replace the electrodes, refer to Section 8.3.

Make sure that the cathode electrode is fully inserted into its socket.

If the fault persists contact your Sherwood Scientific distributor.

9.4 Reproducibly high or low results

Recalibrate the M926, refer to Section 8.4. If necessary, using a fresh bottle of standard solution and another pipette.

Check that carry over in the pipetting is avoided by using a rinse out technique for each sample.

If the fault persists contact your Sherwood Scientific distributor.

9.5 Non-reproducible results.

The M926 requires a five minute warm up to meet the stated specification.

Try another pipette. (Ensure the pipette is reproducible to 0.5% Standard Deviation).

Clean or replace the electrodes, refer to Section 8.3.

Use a fresh bottle of Combined Acid Buffer.

If the fault persists contact your Sherwood Scientific distributor.

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Spares and Accessories

10.1 Ordering Information

When ordering spares or accessories for the M926, please give the following information to your Sherwood Scientific representative; -

Serial number
Catalogue number of part (Cat. No.)
Description
Quantity required

This will ensure that your order is dealt with quickly and efficiently.

The number shown in the third column (Quantity) is the quantity of items that are supplied against the stated catalogue number. If the quantity is greater than one, then only multiples of that quantity can be supplied.

10.2 Spares and Accessories.

Cat. No.	Description	Quantity
001 56 206	Chloride Analyser Combined Acid Buffer, 1 x 500ml	1 bottle
001 56 203	Chloride Analyser Standard, 200mgCl/l, 6 x 100ml	1 pack
001 56 205	Silver Electrode Polish, 25g	1 vial
100 626	Fuse 150mA antisurge	1 up to s/n 12410
001 48 160	Fuse 160mA antisurge (for 230V instruments)	1 from s/n 12411
001 48 315	Fuse 315mA antisurge (for 115V instruments)	1 from s/n 12411
473 56 903	Printer c/w cable and mains adapter (UK version)	1
473 56 904	Printer c/w cable and mains adapter (EURO version)	1
473 56 905	Printer c/w cable and mains adapter (110V version)	1
473 59 700	Printer consumables kit	1 pack
925 11 002	1 x cathode and 2 x detecting electrodes, set of 3	1 set
925 11 003	Anodes, pack of 3	1 pack
925 11 009	Beaker, borosilicate glass, graduated at 10ml	1
925 14 001	Stirrer, 20mm	1
925 89 001	Service manual	1
926 29 015	Datagate Salt Analysis LIMS c/w Software on 2 discs (3.5" format) Multi-port Interface Box Cable from Interface Box to computer serial port Cable from Interface box to M926	1

Options for Datagate

Balance)	details available
Barcode reader)	upon request

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Sherwood Scientific Warranty Statement

Sherwood Scientific warrants, subject to the conditions itemised within this document, through either Sherwood Scientific personnel or personnel of its authorised distributors, to repair or replace free of all charges, including labour, any part of this product which fails within the warranty time specified in this document as appertaining to this particular product. Such failure must have occurred because of a defect in material or workmanship and not have occurred as a result of operation of the product other than in accordance with procedures described in the Instructions furnished with this product.

Conditions and specific exceptions, which apply to the above statement, are as follows: -

1. End-user warranty time commences on the date of delivery of product to end users' premises.
2. *Free of all charges* statement applies only in areas recognised by Sherwood Scientific as being serviced either directly by its own personnel, or indirectly through personnel of an authorised distributor. Products purchased outside of these areas requiring service during the warranty period will incur charges relative to the travel/transit costs involved. However, products purchased in such an area will be serviced during the warranty period free of all charges providing they are returned, carriage paid, to either Sherwood Scientific or by pre-arrangement to an authorised Sherwood Scientific distributor.
3. All maintenance, (other than operator maintenance as described in the Instructions), repairs or modifications have been made by Sherwood Scientific authorised personnel.
4. This product has where applicable been operated using Sherwood Scientific specified supplies and reagents.
5. Sherwood Scientific reserves the right to make any changes in the design or construction of future products of this type, at any time, without incurring any obligation to make any changes whatsoever to this particular product.
6. Reagents, supplies, and user maintenance items are not included in this warranty, which specifically excludes:
 - a) Chemical reagents.
 - b) Fuses
7. Repair or replacement of any part failing due to abnormal conditions including the following, are excluded from this warranty: -
 - a) Flood, lightning, earthquake, tornado, hurricane, or any other natural or man-made disaster.
 - b) Fire, bombing, armed conflict, malicious mischief or sprinkler damage.
 - c) Physical abuse, misuse, sabotage or electrical surge.
 - d) Damage incurred in moving the product to another location.
8. User agrees to permit Sherwood Scientific personnel or personnel of its authorised distributor to make changes in the product which do not affect results obtained, but do improve product reliability.

Sherwood Scientific End-User Warranty
continued

Representations and warranties purporting to be on behalf of Sherwood Scientific made by any person, including distributors and representatives of Sherwood Scientific which are inconsistent or in conflict with the terms of this warranty, (including but limited to the limitations of the liability of Sherwood Scientific as set forth above), shall not be binding upon Sherwood Scientific unless reduced to writing and approved by an officer of Sherwood Scientific.

Except for the obligations specifically set forth in this warranty statement, in no event shall Sherwood Scientific Limited be liable for any direct, indirect, special, incidental or consequential damages, whether based on contract, tort or any other legal theory and whether advised of the possibility of such damages.

Neither Sherwood Scientific nor any of its third party suppliers makes any other warranty of any kind, whether expressed or implied, with respect to Sherwood Scientific products.

Sherwood Scientific Limited
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Cambridge
CB1 8DH
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Warranty Term: - 12 months