

Congratulations !

You have purchased the latest in benchtop Conductivity-TDS-Temperature instrumentation. We trust that your new **901-C** will give you many years of reliable service.

The **901-C** is a breeze to operate. This manual has been designed to help you get started, and also contains some handy application tips. If at any stage you require assistance, please contact either your local TPS representative or the TPS factory in Brisbane.

The manual is divided into the following sections:

1. Table of Contents

Each major section of the handbook is clearly listed. Sub-sections have also been included to enable you to find the information you need at a glance.

2. Introduction

The introduction has a diagram and explanation of the display and controls of the **901-C**. It also contains a full listing of all of the items that you should have received with your **901-C**. Please take the time to read this section, as it explains some of items that are mentioned in subsequent sections.

3. Main Section

The main section of the handbook provides complete details of the **901-C**, including operating modes, calibration, troubleshooting, specifications, and warranty terms.

4. Appendices

Appendices containing background information and application notes are provided at the back of this manual.

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Model 901-C Conductivity-TDS- Temp. Meter

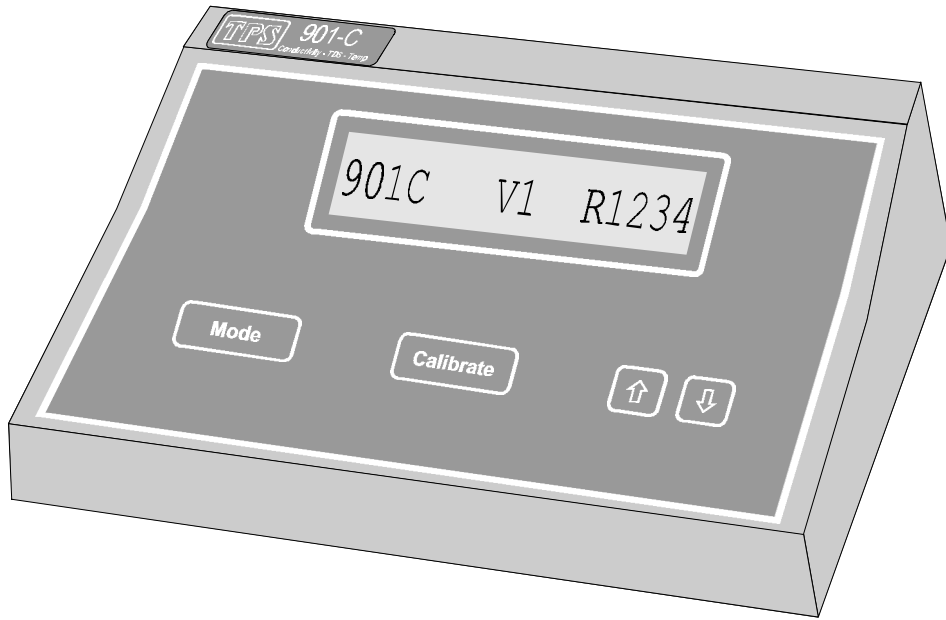
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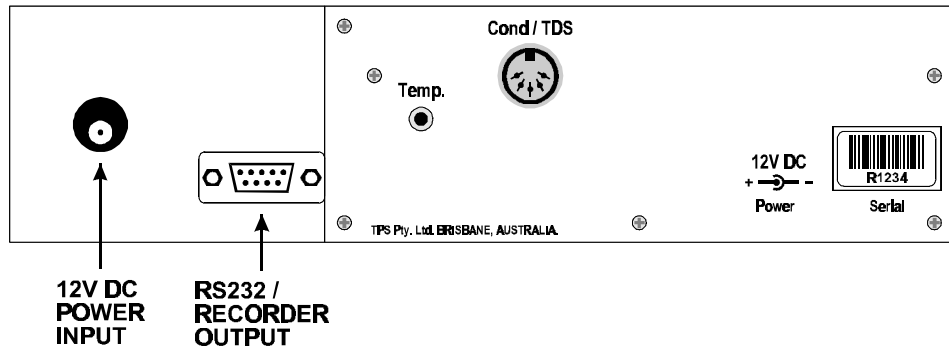
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1. Introduction

1.1 901-C Display and Controls



1.2 901-C Rear Panel Connectors



1.3 901-C Front Panel

Display

- 16 character alphanumeric LCD with 14.5 mm characters.
- Displays Conductivity or TDS plus Temperature simultaneously.
- User friendly text prompts and error messages.
- Serial number is displayed when the **901-C** is switched on.

Mode

Key

- Switches between the various display and optional RS232 modes. See section 2.
- Used to select k factor of Conductivity/TDS sensor. See section 8.

Calibrate

Key




- Used to calibrate Conductivity, TDS, and Temperature. See sections 3, 4 and 5.



and



Keys

- Used for temperature calibration. See section 5.
- Press  to recall Zero value from last successful Conductivity or TDS calibration.
- Press  to recall k factor value from last successful Conductivity or TDS calibration.
- Used to select baud rate when optional RS232 port is fitted. See section 6.1.
- Used to select output "send" rate when optional RS232 port is fitted. See section 6.2
- Press  at turn-on to initialise the unit. See section 9.

1.4 Unpacking Information

Before using your new **901-C**, please check that the following accessories have been included:

	Part No
1. 901-C Conductivity-TDS-Temp Meter	126125
2. K=1/ATC Conductivity Sensor.....	122226
3. Temperature/ATC Sensor	121245
4. 2.76mS/cm Conductivity Standard, 200mL.....	122306
5. 2.0 ppK TDS Standard, 200mL.....	122307
6. AC/DC Power Adaptor.....	130044
7. 901-C Handbook	130050

Options that may have been ordered with your **901-C**:

1. K=10/ATC Conductivity Sensor.....	122222
2. K=0.1/ATC Conductivity Sensor.....	122224
3. Flexible arm type sensor holder	130088
4. RS232 option (includes cable)	130029
5. RS232 Communication software for Windows.....	130086
6. Recorder output option (includes cable).....	130028
7. Recorder PLUS RS232 option (includes cable).....	130049

1.5 Specifications

	Ranges	Resolution	Accuracy
Conductivity	k=0.1 Sensor		±0.5% of full scale of selected range at 25 °C
	0 to 2.000 µS/cm	0.001 µS/cm	
	0 to 20.00 µS/cm	0.01 µS/cm	
	0 to 200.0 µS/cm	0.1 µS/cm	
	0 to 2000 µS/cm	1 µS/cm	
	k=1.0 Sensor		
	0 to 20.00 µS/cm	0.01 µS/cm	
	0 to 200.0 µS/cm	0.1 µS/cm	
	0 to 2000 µS/cm	1 µS/cm	
	0 to 20.00 mS/cm	0.01 mS/cm	
	k=10 Sensor		
	0 to 200.0 µS/cm	0.1 µS/cm	
0 to 2000 µS/cm	1 µS/cm		
0 to 20.00 mS/cm	0.01 mS/cm		
0 to 200.0 mS/cm	0.1 mS/cm		
TDS	k=0.1 Sensor		±0.5% of full scale of selected range at 25 °C
	0 to 1.000 ppM	0.001 ppM	
	0 to 10.00 ppM	0.01 ppM	
	0 to 100.0 ppM	0.1 ppM	
	0 to 1000 ppM	1 ppM	
	k=1.0 Sensor		
	0 to 10.00 ppM	0.01 ppM	
	0 to 100.0 ppM	0.1 ppM	
	0 to 1000 ppM	1 ppM	
	0 to 10.00 ppK	0.01 ppK	
	k=10 Sensor		
	0 to 100.0 ppM	0.1 ppM	
0 to 1000 ppM	1 ppM		
0 to 10.00 ppK	0.01 ppK		
0 to 100.0 ppK	0.1 ppK		
Temperature	-10.0 to 120.0 °C	0.1 °C	±0.2 °C

Additional Conductivity and TDS Specifications

Sensor Type.....Glass body with two platinised platinum plates.
In-built ATC.

Temperature Compensation..... Automatic, 0 to 100 °C

Calibration Automatic zero and span calibration.

Standard Recognition **Conductivity**
14.94 µS/cm, 73.90 µS/cm, 150.0 µS/cm,
717.8 µS/cm, 1,413 µS/cm, 2.76 mS/cm,
6.67 mS/cm, 12.9 mS/cm, 24.8 mS/cm,
58.0 mS/cm, 111.9 mS/cm

TDS
69.5 ppM, 2.00 ppK, 8.0 ppK, 36.0 ppK

Sensor Span Range k=0.1 : k=0.075 to k=0.133
k=1.0 : k=0.75 to k=1.33
k=10 : k=7.5 to k=13.3

Additional Temperature Specifications

Sensor Type.....Silicon Transistor

Offset Range.....-10.0 to +10.0 °C

General Specifications

RS232 Output	300, 9600 or 19200 baud.
(optional)	8 bits, No Parity, 1 stop bit, XON/XOFF Protocol.
Recorder Output	Cond : 0 to 2000 Counts for 0 to 2000 mV ie. 2.76 mS/cm = 276 mV
(optional)	TDS : 0 to 1000 Counts for 0 to 1000 mV ie. 36.0 ppK = 360 mV
	Temp : -10.0 to 120.0 °C for 0 to 2000 mV ie. 0.0 °C = 153.8 mV
	Output impedance approx 1000 Ohms.
Power	12V DC by AC/DC power adaptor.
Dimensions	270 x 210 x 75 mm
Mass	Instrument only : Approx 1.0 kg Full Kit : Approx 2.5 kg
Environment	Temperature : 0 to 45 °C Humidity : 0 to 90 % R.H.

2. Operating Modes

Press the **Mode** key to select the desired operating mode. The sequence is shown in the following table...

Conductivity plus Temperature Mode	2.76mS	25.0°C
Conductivity data is shown on the left and Temperature data is shown on the right. Select this mode to calibrate Conductivity.		

↓ **Mode**

TDS plus Temperature Mode	2.00ppK	25.0°C
TDS data is shown on the left and Temperature data is shown on the right. Select this mode to calibrate TDS.		

↓ **Mode**

Temperature Mode	25.0°C
Temperature data only is shown on the left. Select this mode to calibrate Temperature.	

↓ **Mode**

Back to Conductivity plus Temperature mode

The following modes are added when the optional RS232 port is fitted...

RS232 Send Rate	Send Rate ↑ 0 ↓
Sets the Data output rate, in seconds. Press ↑ or ↓ to set this value from 0 to 9999 seconds.	

↓ **Mode**

RS232 Baud Rate	Baud Rate ↑ 19200 ↓
Allows selection of the RS232 Baud Rate. Press ↑ or ↓ to select 300, 9600 or 19200 baud.	

↓ **Mode**

Back to Conductivity plus Temperature mode


3. Conductivity Calibration

3.1 Calibration Procedure

1. Switch the **901-C** on and select Conductivity plus Temperature mode (section 2).
2. Plug the Conductivity sensor into the **Cond / TDS** socket. If a k=10 or k=0.1 sensor is being used, ensure that it has been correctly selected (see section 8). The Temperature sensor is not required, as Automatic Temperature Compensation for Conductivity is done via the Conductivity Sensor.
3. Rinse the Conductivity electrode in distilled water. Shake off as much water as possible. Blot the outside of the electrode dry. **DO NOT BLOT THE ELECTRODE SURFACES.**

4. Zero Calibration

Allow the Conductivity sensor to dry in air.

When the reading has stabilised at or near Zero, press and hold the  for 1 second.


The * will not be removed after a zero calibration.

5. Standard Calibration

Allowable Conductivity standards are listed in the specifications in section 1.5, and should be selected according to your range of interest.

Place the electrode into a sample of Conductivity standard so that it is immersed at least to the vent hole in the body.

DO NOT place the electrode directly into the bottle of standard. Discard the used sample of standard after use. It is advisable to use a narrow sample vessel to minimise the use of standard solution.

When the reading has stabilised, press and hold the  key for 1 second to calibrate.

The * will now be replaced by a decimal point if calibration was successful.

6. The **901-C** is now calibrated for Conductivity and is ready for use in this mode.

Discard the used samples of standard.

3.2 Calibration Notes

1. A Zero calibration should be performed at least monthly. In low conductivity applications (where a zero error is particularly significant), a zero calibration may have to be done weekly.
2. A Standard calibration should be performed at least weekly. Of course, more frequent calibration will result in greater confidence in results.
3. Conductivity and TDS calibration data is stored separately in memory. Ensure that the **901-C** has been correctly calibrated for the mode in which it will be used. The **901-C** does not require re-calibration when alternating between Conductivity and TDS modes, providing the instrument has been correctly calibrated for both.
4. All calibration information is retained in memory when the **901-C** is switched off, even when the power supply is removed.

3.3 Calibration Messages

1. If a Zero calibration has been successfully performed, the **901-C** will display the Zero of the sensor and then return to Conductivity mode. For example...

Zero OK, 0.1%

2. If a Span calibration has been successfully performed, the **901-C** will display the k factor of the sensor and then return to Conductivity mode. For example...

Cal OK, k=1.00

Note that " * " in the Conductivity reading has now been replaced by a decimal point, due to the successful calibration.

3. If a Span calibration has failed, the **901-C** will display the following messages and then the failed k factor of the sensor before returning to Conductivity mode. For example...

Calibrate Failed

then:

STD=2760uS ?

then:

k=0.70, Fails

Note that a " * " replaces the decimal point in the Conductivity reading to indicate that Conductivity is not correctly calibrated.

Check that the sensor is immersed at least to the vent hole in the body, and that the standard is correct before attempting calibration again.


4. TDS Calibration

4.1 Calibration Procedure

1. Switch the **901-C** on and select TDS plus Temperature mode (section 2).
2. Plug the TDS sensor into the **Cond / TDS** socket. If a k=10 or k=0.1 sensor is being used, ensure that it has been correctly selected (see section 8). The Temperature sensor is not required, as Automatic Temperature Compensation for TDS is done via the TDS Sensor.
3. Rinse the TDS electrode in distilled water. Shake off as much water as possible. Blot the outside of the electrode dry. **DO NOT BLOT THE ELECTRODE SURFACES.**

4. Zero Calibration

Allow the TDS sensor to dry in air.

When the reading has stabilised at or near Zero, press and hold the  for 1 second.


The * will not be removed after a zero calibration.

5. Standard Calibration

Allowable TDS standards are listed in the specifications in section 1.5, and should be selected according to your range of interest.

Place the electrode into a sample of TDS standard so that it is immersed at least to the vent hole in the body.

DO NOT place the electrode directly into the bottle of standard. Discard the used sample of standard after use. It is advisable to use a narrow sample vessel to minimise the use of standard solution.

When the reading has stabilised, press and hold the  key for 1 second to calibrate.

The * will now be replaced by a decimal point if calibration was successful.

6. The **901-C** is now calibrated for TDS and is ready for use in this mode.

Discard the used samples of standard.

4.2 Calibration Notes

1. A Zero calibration should be performed at least monthly. In low TDS applications (where a zero error is particularly significant) a zero calibration may have to be done weekly.
2. A Standard calibration should be performed at least weekly. Of course, more frequent calibration will result in greater confidence in results.
3. Conductivity and TDS calibration data is stored separately in memory. Ensure that the **901-C** has been correctly calibrated for the mode in which it will be used. The **901-C** does not require re-calibration when alternating between Conductivity and TDS modes, providing the instrument has been correctly calibrated for both.
5. All calibration information is retained in memory when the **901-C** is switched off, even when the power supply is removed.

4.3 Calibration Messages

1. If a Zero calibration has been successfully performed, the **901-C** will display the Zero of the sensor and then return to TDS mode. For example...

Zero OK, 0.1%

2. If a Span calibration has been successfully performed, the **901-C** will display the k factor of the sensor and then return to TDS mode. For example...

Cal OK, k=1.00

Note that " * " in the TDS reading has now been replaced by a decimal point, due to the successful calibration.

3. If a Span calibration has failed, the **901-C** will display the following messages and then the failed k factor of the sensor before returning to TDS mode. For example...

Calibrate Failed

then:

STD=36.00ppK ?

then:

k=0.70, Fails

Note that a " * " replaces the decimal point in the TDS reading to indicate that TDS is not correctly calibrated.

Check that the sensor is immersed at least to the vent hole in the body, and that the standard is correct before attempting calibration again.

5. Temperature Calibration

5.1 Calibration Procedure

1. Switch the **901-C** on and select Temperature mode (see section 2).
2. Plug the temperature sensor (Part No 121245) into the **Temp.** socket.
3. Place the sensor alongside a good quality mercury thermometer into a beaker of room temperature water. Stir the sensor and the thermometer gently to ensure an even temperature throughout the beaker.
4. When the reading has stabilised, press the **Calibrate** key.
5. The **901-C** now enters temperature calibration. For example...

Enter True Temp

then:

26*0°C ↑ 25.0 ↓

6. Press the **↑** and **↓** keys until the display shows the same temperature as the mercury thermometer.
7. Press the **Calibrate** key to calibrate the temperature readout.
Alternatively, press the **Mode** key to abort temperature calibration.

5.2 Calibration Notes

1. Temperature calibration information is stored in memory when the meter is switched off, even when the power supply is removed.
2. Temperature does not need to be re-calibrated unless the Temperature sensor is replaced or the meter is initialised.

5.3 Calibration Messages

1. If a temperature calibration has been successfully performed, the **901-C** will display the offset value of the sensor and then return to Temperature mode. For example...

Temp Cal . OK then: **Offset=1.0°c**

The " * " is replaced by a decimal point in the Temperature reading to indicate that Temperature is correctly calibrated.

2. If a temperature calibration has failed, the **901-C** will display the failed offset value of the sensor before returning to Temperature mode. For example...

Temp Cal . Fai l then: **Offset=11.0°c**

Note that " * " replaces the decimal point in the Temperature reading to indicate that Temperature is not correctly calibrated.



6. RS232 Port

This section is applicable if the optional RS232 port is fitted.


6.1 Setting the Baud Rate

1. Select RS232 Baud Rate mode (see section 2).
2. The currently selected Baud Rate is displayed. For example...

Baud Rate ↑ 19200 ↓

Press the  and  keys to scroll through the available Baud Rates of 300, 9600 or 19200 baud.

Ensure that the displayed baud rate matches the Baud Rate set on the printer or PC with which the **901-C** is communicating.

3. Press the  key to return to any of the normal display modes as required.


6.2 Sending Readings to the RS232 Port


The **901-C** can send readings to the RS232 port at a pre-set rate, in seconds.

To set this Send Rate...

1. Select RS232 Send Rate mode (see section 2).
2. The currently selected Send Rate is displayed. For example...


Send Rate ↑ 0 ↓

Press the  key to increase the Send Rate.

Press the  key to decrease the Send Rate.

The Send Rate can be set from 0 to 9999 seconds.

Set the Send Rate to Zero to allow the **901-C** to accept commands from a remote computer.

3. Press the  key to return to any of the normal display modes as required.

6.3 RS232 Configuration

The **901-C** RS232 configuration is 8 bits, No Parity, 1 Stop Bit, XON/XOFF Protocol.

6.4 Communication and Statistical Software

Communication between the **901-C** and a PC can be handled with any RS232 communication software. A Windows communication package is optionally available from TPS (part number 130086).

Once the data is saved to disk, the next problem is how to use it. The data sent by the **901-C** is formatted in columns that can be imported by programs such as Microsoft[®] Excel[®] and Lotus 123[®].

Information on how to use the software is provided in the README files on the diskette.

6.5 Commands

The following commands can be sent from a PC to the **901-C**. Note that <cr> denotes carriage return and <lf> denotes a line feed.

Action	Command	Notes
Request current data	?D<cr>	Returns the current Conductivity/TDS and Temperature data from the 901-C . The print rate must be set to zero (see section 6.2).
Request status information	?S<cr>	Returns the instrument model, firmware version and serial number. For example... 901C♦♦V1♦♦R1234<cr> where “♦” are spaces

6.6 Data Format

- A.** Data is returned to the RS232 port by the **901-C** in the following format when requested by a PC with the ?D command (section 6.5):

```
CCCCCUUU♦TTTTTToC♦<cr>
```

- or B.** Data is sent to the RS232 port by the **901-C** in the following format when it is sent by the **901-C** using the Send function (section 6.2):

```
CCCCCUUU♦TTTTTToC♦<cr><lf>
```

- where:** **CCCCC** is the Conductivity or TDS data. maximum 6 characters, right justified. A “ * ” is sent instead of the decimal point if the reading is not calibrated.
- UUU** is the unit description, left justified. Either “**uS♦**”, “**mS♦**”, “**ppM**” or “**ppK**”. (“♦” is one space.)
- ♦** is one space.
- TTTTTT** is the Temperature data. Maximum 6 characters, right justified. A “ * ” is sent instead of the decimal point if the reading is not calibrated.
- oC♦** is the Temperature unit description, left justified. (“♦” is one space.)

Notes:

1. **+OVR** or **-OVR** is sent when the Data is over-range.
2. **BUSY<cr>** is sent when the **901-C** is Busy (ie in calibration, Baud Rate mode, Send Rate mode etc.) or when data is not available.

7. Recorder Output Option

This section is applicable when the optional analogue recorder output is fitted. The recorder output depends on the currently selected display mode, as detailed below...

Display Mode	Parameter sent to Recorder Port
Conductivity & Temperature	Conductivity
TDS and Temperature	TDS
Temperature only	Temperature
RS232 Send Rate	No Output
RS232 Baud Rate	No Output

The output voltages are as follows:

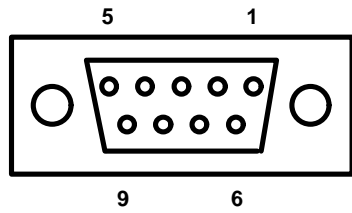
Cond.....0 to 2000 Counts for 0 to 2000 mV
 ie. 2.76 mS/cm = 276 mV

TDS.....0 to 1000 Counts for 0 to 1000 mV
 ie. 36.0 ppK = 360 mV

Temperature-10.0 to 120.0 °C for 0 to 2000 mV
 i.e. 0.0 °C = 152 mV Output

Output impedance approx 1000 Ohms.

7.1 RS232 / Recorder Output Socket Connections



Pin No	Connection
1	Chassis
2	Receive RS232 Data
3	Transmit RS232 Data
4	+10 V DC Power Output
5	Ground
6	Recorder Output Signal
7	Recorder Output Common
8	No Connection
9	No Connection

8. Selecting k=10 or k=0.1 Sensors

The **901-C** automatically recognises a k=1.0 sensor. The **901-C** **does not** automatically recognise k=0.1 or k=10 sensors. When a k=0.1 or k=10 sensor is used, the **901-C** must be manually set to the correct k factor before use. The following procedure describes how to select a k=0.1 or k=10 sensor.

1. Switch the meter **OFF** and wait for 10 seconds.
2. Press and HOLD the **Mode** key while switching the meter back on.
3. The meter now displays the current manual k factor. For example...

k factor, k=10.0

Press the **↑** or **↓** keys to roll through the choice of k=10 or k=0.1 sensors.

4. Press the **Mode** key to exit when the desired k factor sensor has been selected.

The 901-C will now display its Model, Firmware Version and Serial Number for approximately 4 seconds, before going on to Conductivity plus Temperature mode.

Notes

The manual k factor selection is kept in memory when the meter is switched off, even when the power supply is removed.

If a k=0.1 sensor is being used, this must be manually selected again when the unit is initialised (see section 9).


The **901-C** will always automatically recognise a k=1.0 sensor, regardless of the manual k factor selection.

Calibration settings for k=0.1, k=1.0 and k=10 sensors are **NOT** stored separately. The **901-C** requires re-calibration when any new sensor is connected.

9. Initialising the 901-C

If the calibration settings of the **901-C** exceed the allowable limits, the unit may need to be initialised to factory default values. This action may be required if the sensor is replaced, or when the unit repeatedly fails to calibrate.

To initialise the **901-C**...

1. Switch the **901-C OFF** and wait for 10 seconds.
2. Press and hold the  key while switching the **901-C** back on.
3. The following messages are now displayed...

I n i t i a l i z i n g	then:	901Cs V1 R1234
--------------------------------	-------	-----------------------

(The "s" after "901C" is shown when the optional RS232 port is fitted.)

4. The **901-C** now goes on to Conductivity plus Temperature mode. Note that a " * " replaces each of the decimal points in the Conductivity, TDS and Temperature readings, indicating that the unit requires calibration.

Notes

When the optional RS232 port is fitted, the Baud Rate is set to 9600 and the Send Rate is set to zero. See sections 6.1 and 6.2 for details if these settings need to be altered.

If a k=0.1 Conductivity/TDS sensor is being used, the manual k factor selection must be re-set to k=0.1 before use.

10. Troubleshooting**10.1 General Error Messages**

Error Message	Possible Causes	Remedy
Not Factory Cal. (displayed at turn-on)	The EEPROM chip which contains the factory calibration information has failed.	Switch the 901-C off, wait 10 seconds, and try switching on again. If message persists, then the unit must be returned to TPS for service.
EEPROM WriteFail then: Contact Factory (displayed at calibration or set-up).	Storage of user calibration settings to the EEPROM has failed.	Switch the 901-C off, wait 10 seconds, and then switch the unit on again. Attempt calibration/setup again. If message persists, then the unit must be returned to TPS for service.

10.2 Conductivity and TDS Troubleshooting

Symptom	Possible Causes	Remedy
Unit fails to calibrate, even with new electrode.	Calibration settings outside of allowable limits due to previous failed calibration.	Initialise the unit. See section 9.
Unit attempts Span calibration instead of Zero calibration.	Electrode has Zero error.	Thoroughly rinse electrode in distilled water and allow to completely dry in air before attempting zero calibration. If instrument does not calibrate at Zero with electrode disconnected, then the instrument is faulty.
Standard calibration fails, and k factor is greater than 0.133, 1.33 or 13.3 (depending on k factor of sensor).	<ol style="list-style-type: none"> 1. Electrode is not immersed deeply enough. 2. Electrode may have a build-up of dirt or oily material on electrode plates. 3. Platinum-black coating has worn off. 4. Standard solution is inaccurate. 5. Electrode is faulty. 6. Faulty instrument. 7. k-factor incorrectly set if using k=0.1 or k=10 sensor. 	<p>Immerse electrode at least to the vent hole in the glass body.</p> <p>Clean electrode, as per the instructions detailed in section 11.1.</p> <p>Electrode requires replatinisation. Return to the factory, or see details in section 11.2.</p> <p>Replace standard solution.</p> <p>Return electrode to factory for repair or replacement.</p> <p>Return instrument to factory for repair.</p> <p>Set the correct k-factor, as per section 8.</p>
Standard calibration fails, and k factor is less than 0.075, 0.75 or 7.5 (depending on k factor of sensor).	<ol style="list-style-type: none"> 1. Standard solution is inaccurate. 2. Electrode may have a build-up of conductive material, such as salt. 3. Electrode is faulty. 4. Faulty instrument. 5. k-factor incorrectly set if using k=0.1 or k=10 sensor. 	<p>Replace standard solution.</p> <p>Clean electrode, as per the instructions detailed in section 11.1.</p> <p>Return electrode to factory for repair or replacement.</p> <p>Return instrument to factory for repair.</p> <p>Set the correct k-factor, as per section 8.</p>

Continued next page...

Conductivity and TDS Troubleshooting, continued...

Inaccurate readings, even when calibration is successful.	<ol style="list-style-type: none"> 1. Electrode may have a build-up of dirt or oily material on electrode plates. 2. Platinum-black coating has worn off. 	<p>Clean electrode, as per the instructions detailed in section 11.1.</p> <p>Electrode requires replatinisation.</p> <p>Return to the factory, or see details in section 11.2.</p>
Readings drift.	<ol style="list-style-type: none"> 1. Electrode may have a build-up of dirt or oily material on electrode plates. 	<p>Clean electrode, as per the instructions detailed in section 11.1.</p>
Readings are low or near zero.	<ol style="list-style-type: none"> 1. Electrode may have a build-up of dirt or oily material on electrode wires. 2. Electrode is not immersed deeply enough. 3. Electrode is faulty. 4. Faulty instrument. 5. k-factor incorrectly set if using k=0.1 or k=10 sensor. 	<p>Clean electrode, as per the instructions detailed in section 11.1.</p> <p>Immerse electrode at least to the vent hole in the glass body.</p> <p>Return electrode to factory for repair or replacement.</p> <p>Return instrument to factory for repair.</p> <p>Set the correct k-factor, as per section 8.</p>

10.3 Temperature Troubleshooting

Symptom	Possible Causes	Remedy
Meter reads "OverR" in Temperature mode.	Temperature sensor is connected, but is faulty.	<p>Check the temperature sensor connector, and replace if necessary.</p> <p>Replace temperature sensor (part no 121245) if problem persists.</p>
Meter displays Temperature with an "m", even when temperature sensor is plugged in.	<ol style="list-style-type: none"> 1. Faulty connector. 2. Incorrect temperature sensor. 3. Faulty temperature sensor. 	<p>Check the connector and replace if necessary.</p> <p>Fit new temperature sensor, part number 121245.</p> <p>Fit new temperature sensor, part number 121245.</p>
Temperature inaccurate and cannot be calibrated.	<ol style="list-style-type: none"> 1. Faulty connector. 2. Faulty temperature sensor. 	<p>Check the connector and replace if necessary.</p> <p>Fit new temperature sensor, part number 121245.</p>

11. Appendices

11.1 Care, Cleaning and Maintenance of Conductivity Sensors

11.1.1 Care of Conductivity Sensors

The conductivity section of the electrode supplied with your **901-C** consists of two platinum plates that are plated with a layer of “platinum-black”. This is quite a soft layer and is required for stable, accurate measurements. In time, the platinum-black layer may wear off in some applications, at which time the electrode will require replatinising (see section 11.2). You can help to maintain the platinum-black layer by following these simple rules:

1. **NEVER** touch or rub the electrode wires with your fingers, cloth etc.
2. Avoid using the electrode in solutions that contain a high concentration of suspended solids, such as sand or soil, which can abrade the electrode wires. Filter these types of solutions first, if possible.
3. Avoid concentrated acids. If you must measure acids, remove the electrode immediately after taking the measurement and rinse well with distilled water.

Conductivity electrodes can be stored dry. Ensure that the electrode is stored in a covered container, to avoid dust and dirt build-up.

11.1.2 Cleaning of Conductivity Sensors

Platinised platinum Conductivity electrodes can only be cleaned by rinsing in a suitable solvent. **DO NOT wipe the electrode plates**, as this will remove the platinum-black layer.

1. Rinsing in distilled water will remove most build-ups of material on the electrode wires.
2. Films of oils or fats on the electrode wires can usually be removed by rinsing the electrode in methylated spirits.
3. Stubborn contamination can be removed by soaking the electrode in a solution of 10 parts distilled water TO 1 part Concentrated HCl. The electrode should not be soaked for more than approximately 5 minutes, otherwise the platinum-black layer may start to dissolve.
4. If all of these methods fail, then the last resort is to physically scrub the electrode plates, which will remove the contaminant and the layer of platinum-black. Use only a cloth or nylon scouring pad. **DO NOT USE STEEL WOOL**. The electrode will then need to be cleaned in HCl, as per step 3 and replatinised, as per section 11.2.

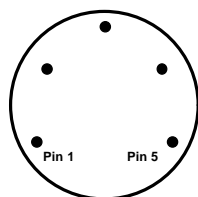
11.2 Replatinising Conductivity Sensors

There are several ways to replatinise Conductivity electrodes.

1. The simplest way is to return the electrode to the TPS factory. We can fully clean the electrode, replatinise it and test all aspects of its performance.
2. An automatic replatiniser is available from TPS, along with replatinising solution. This will plate the electrodes for the right amount of time at the correct current. Ordering details are as follows...

Automatic Conductivity Electrode Replatiniser Part No 122160
20mL Platinising Solution (suitable for approx 30 uses) Part No 122300

3. Conductivity electrodes can be manually replatinised, according to the following procedure...
 - (a) Soak the electrode in a solution of 1 part Concentrated HCl and 10 parts distilled water for approximately 5 minutes.
 - (b) Rinse the electrode well in distilled water.
 - (c) Immerse the electrode in platinising solution at least to the vent hole in the glass body. Platinising solution is available from TPS (part no 122300). Alternatively, platinising solution can be prepared by dissolving 1g of Hydrogen Chloroplatinate (H_2PtCl_6) in 30mL of distilled water, and including about 0.01g of Lead Acetate ($(CH_3COO)_2Pb$) and a drop or two of concentrated HCl.
 - (d) Apply a direct current of 10mA between pins 1 and 5 of the electrode plug, as per the diagram below. Reverse the polarity every 30 seconds. After approximately 8 minutes (4 minutes per electrode plate), they should have an even “sooty” appearance. Avoid excess current as this will cause incorrect platinising.
 - (e) After platinising, rinse the electrode well in distilled water.
 - (f) If you have any doubts about any of these steps, then you should consider returning the electrode to the factory. The cost of replatinising is quite low, and you will be guaranteed of the best possible result.



Sensor Connector

12. Warranty

TPS Pty. Ltd. guarantees all instruments and sensors to be free from defects in material and workmanship when subjected to normal use and service. This guarantee is expressly limited to the servicing and/or adjustment of an instrument returned to the Factory, or Authorised Service Station, freight prepaid, within twelve (12) months from the date of delivery, and to the repairing, replacing, or adjusting of parts which upon inspection are found to be defective. Warranty period on sensors is three (3) months.

There are no express or implied warranties which extend beyond the face hereof, and TPS Pty. Ltd. is not liable for any incidental or consequential damages arising from the use or misuse of this equipment, or from interpretation of information derived from the equipment.

Shipping damage is not covered by this warranty.

PLEASE NOTE:

A guarantee card is packed with the instrument or sensor. This card must be completed at the time of purchase and the registration section returned to TPS Pty. Ltd. within 7 days. No claims will be recognised without the original guarantee card or other proof of purchase. This warranty becomes invalid if modifications or repairs are attempted by unauthorised persons, or the serial number is missing.

PROCEDURE FOR SERVICE

If you feel that this equipment is in need of repair, please re-read the manual. Sometimes, instruments are received for "repair" in perfect working order. This can occur where batteries simply require replacement or re-charging, or where the sensor simply requires cleaning or replacement.

TPS Pty. Ltd. has a fine reputation for prompt and efficient service. In just a few days, our factory service engineers and technicians will examine and repair your equipment to your full satisfaction.

To obtain this service, please follow this procedure:

Return the instrument AND ALL SENSORS to TPS freight pre-paid and insured in its original packing or suitable equivalent. INSIST on a proof of delivery receipt from the carrier for your protection in the case of shipping claims for transit loss or damage. It is your responsibility as the sender to ensure that TPS receives the unit.

Please check that the following is enclosed with your equipment:

- **Your Name and daytime phone number.**
- **Your company name, ORDER number, and return street address.**
- **A description of the fault. (Please be SPECIFIC.)**
(Note: "Please Repair" does NOT describe a fault.)

Your equipment will be repaired and returned to you by air express where possible.

For out-of-warranty units, a repair cost will be calculated from parts and labor costs. If payment is not received for the additional charges within 30 days, or if you decline to have the equipment repaired, the complete unit will be returned to you freight paid, not repaired. For full-account customers, the repair charges will be debited to your account.

- **Always describe the fault in writing.**
- **Always return the sensors with the meter.**