

# MicroChem-T

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**TPS**

PRECISION MEASUREMENT™





## **Congratulations !**

Your new **microCHEM-Temp** transmitter module is a simple, lower power device for interfacing a temperature sensor with datalogging and process control equipment. The industry standard 0 to 1 V DC and 0 to 5 V DC outputs ensure that the **microCHEM-Temp** is compatible with most such devices.

The **microCHEM-Temp** 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.

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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 **microCHEM-Temp**. It also contains a full listing of all of the items that you should have received with the unit. 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 **microCHEM-Temp**, 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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## **1. Introduction**

### **1.1 Unpacking Information**

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

	Part No
1. <b>microCHEM-Temp</b> Transmitter Module	114144
2. Mounting feet, kit of 4, complete with screws NRMICRO	
3. <b>microCHEM-Temp</b> Handbook	130050

#### ***Options that may have been ordered with your microCHEM-Temp:***

*Dip mounted Temperature sensor...*

1. Industrial Temperature Sensor, 5m 114200

*Screw-in Temperature Sensors, and adaptor for 40mm PVC pipe...*

1. Screw-in Industrial Temperature Sensor, 5m 114201
2. 1/4" BSP thread adaptor for 40mm PVC pipe 111305



## 1.2 Specifications

Range 0 to 200 °C  
(sensor limit 120 °C)

Resolution ±1mV (0 – 1 V DC Output) or ±5mV ( 0 – 5 V DC Output)

Accuracy ±1mV (0 – 1 V DC Output) or ±5mV ( 0 – 5 V DC Output)

Linearity ±1mV (0 – 1 V DC Output) or ±5mV ( 0 – 5 V DC Output)

Repeatability ±1mV (0 – 1 V DC Output) or ±5mV ( 0 – 5 V DC Output)

Ambient Drift <0.02% span per / °C

Long term drift <0.1% per year

Zero Range ±10 °C

Enclosure Polycarbonate, waterproof to IP65

Analogue Outputs 0 to 1 V DC  
or 0 to 5 V DC

Isolation Galvanic isolation of sensor input

Power 12V DC, approx 10mA

Dimensions Enclosure : 125 x 85 x 56 mm  
PCB only : 115 x 77 mm  
(82 x 58 mm mounting hole centres)

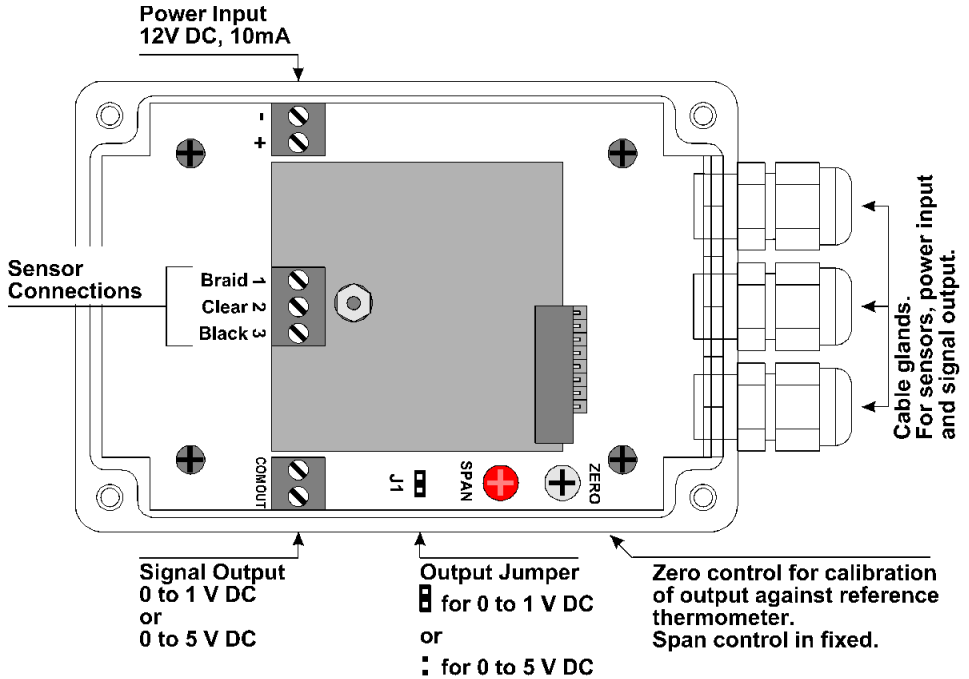
Mass Instrument only : Approx 250 g  
Full Kit : Approx 750 g

Operating Environment: Temperature : 0 to 45 °C  
Humidity : 0 to 95 % R.H.

## 2. Installation and Set-up

### 2.1 Connection and Configuration Diagram

The diagram below is provided as a reference for the terminal connections, configuration jumpers and user-adjustable trimmers that are discussed throughout this section.



## 2.2 Mounting the Enclosure

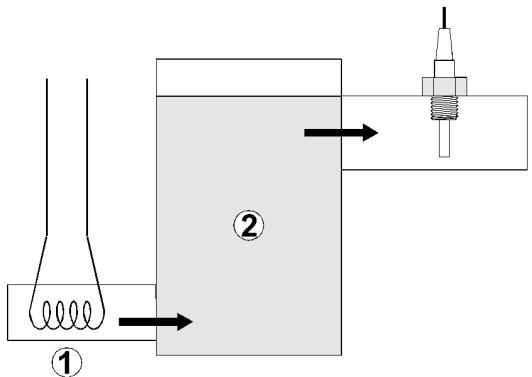
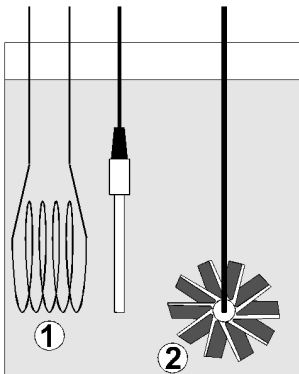
The **microCHEM-Temp** can be mounted directly onto a wall or into a separate enclosure using the mounting kit supplied. Please use the screws supplied to ensure that the waterproof integrity of the enclosure is not compromised.

## 2.3 Mounting the Sensors

Mounting the sensor is a very important aspect of the installation, and is often done incorrectly. In automatic control situations, the sensor should always be mounted as close as possible to the control point (ie. heater or cooling tower etc.). This will cause the sensor to detect the change in Temperature immediately, and shut automatic control off until mixing has taken place. For in-line mounting, it is important that Temperature control is upstream. Additionally, the line can be run through a mixing chamber, such as a large drum, to ensure that the areas of varying temperatures have mixed in properly by the time the solution flows past the sensor. There must always be adequate flow of fresh sample past the sensor for accurate monitoring. The diagrams below show typical mounting arrangements for “dip” mounting and in-line mounting.

### *Dip Mounting In-line Mounting*

- |                                                                                                                      |                                                                                                         |
|----------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|
| <ol style="list-style-type: none"> <li>1. Control point close to sensor.</li> <li>2. Continuous stirring.</li> </ol> | <ol style="list-style-type: none"> <li>1. Injection point upstream from and close to sensor.</li> </ol> |
|----------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|



## 2.4 Terminal Connections

Terminal No.	Connection	Colour
<b>Sensor Connections</b>		
1	Shield of cable	Green
2	Positive Temperature Signal	Clear or White
3	Negative Temperature Signal	Black
<b>Power Input Connections</b>		
-	Negative of 12V DC Input	Customer-defined
+	Positive of 12V DC Input	Customer-defined
<b>Signal Output Connections</b>		
COM	Common of voltage output	Customer-defined
OUT	Positive of voltage output	Customer-defined

## 2.5 Selecting 0 to 1 V DC or 0 to 5 V DC Output

1. Locate the jumper labelled **J1** on the main circuit board.
2. Set **J1** to closed to select 0 to 1 V DC output.
3. Set **J1** to open to select 0 to 5 V DC output.

0 to 1 V DC



0 to 5 V DC



### Note

When setting **J1** to open, we recommend that it is fitted to one of the pins. This is a safe place to keep it, in case the **microCHEM-Temp** needs to be reset for 0 to 1 V DC output in the future.





### **3. Calibration**

#### **3.1 Calibration Procedure**

1. Ensure that the Temperature sensor is correctly connected (see section 2.4).
2. Place the sensor into a beaker of room temperature water, alongside a good quality mercury thermometer. Stir the probe and the thermometer gently to ensure an even temperature throughout the beaker.
3. When the output has stabilised, adjust the **ZERO** control until the output corresponds to the temperature displayed by the mercury thermometer.

For 0 – 1 V DC, the mV output is 5 times the temperature. For example, 25.0 °C corresponds to 125 mV output.

For 0 – 5 V DC, the mV output is 25 times the temperature. For example, 25.0 °C corresponds to 625 mV output.

***DO NOT ADJUST THE RED SPAN CONTROL. THIS IS FACTORY-FIXED AND DOES NOT REQUIRE RE-ADJUSTMENT.***

4. The **microCHEM-Temp** is now calibrated and ready for Temperature measurements.

#### **3.2 Calibration Notes**

1. The **microCHEM-Temp** does not need to be re-calibrated unless the Temperature sensor is replaced, or the ZERO control is inadvertently adjusted.



## 4. Troubleshooting

### 4.1 Instrument Function Troubleshooting

Symptom	Possible Causes	Remedy
Incorrect analogue output signal.	<ol style="list-style-type: none"> <li><b>J1 Output Jumper</b> incorrectly set for required output.</li> <li>Instrument is faulty.</li> </ol>	<p>Check that the <b>J1 Output Jumper</b> is correctly set for 0 to 1 V DC or 0 to 5 V DC output, as per requirements. Adjust if necessary (see section 2.5).</p> <p>Return to TPS for repair.</p>

### 4.2 Temperature Troubleshooting

Symptom	Possible Causes	Remedy
Meter outputs large positive or negative constant output	<ol style="list-style-type: none"> <li>Sensor not connected or not connected correctly.</li> <li>Sensor is faulty.</li> </ol>	<p>Check sensor connections (section 2.4).</p> <p>Replace sensor.</p>
Temperature inaccurate and cannot be calibrated.	Faulty temperature sensor.	Return sensor to factory for replace, or replace sensor.



## **5. Warranty**

TPS Pty. Ltd. guarantees all instruments and electrodes 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 electrodes 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 electrode. 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 electrode 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 (our service form is available on our website [www.tps.com.au](http://www.tps.com.au)):

- **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.**