



INSTRUCTION MANUAL

WaterTechw² TMP Temperature Sensor
(Range:-10 to 80°C, Cable Length: 10 metres)



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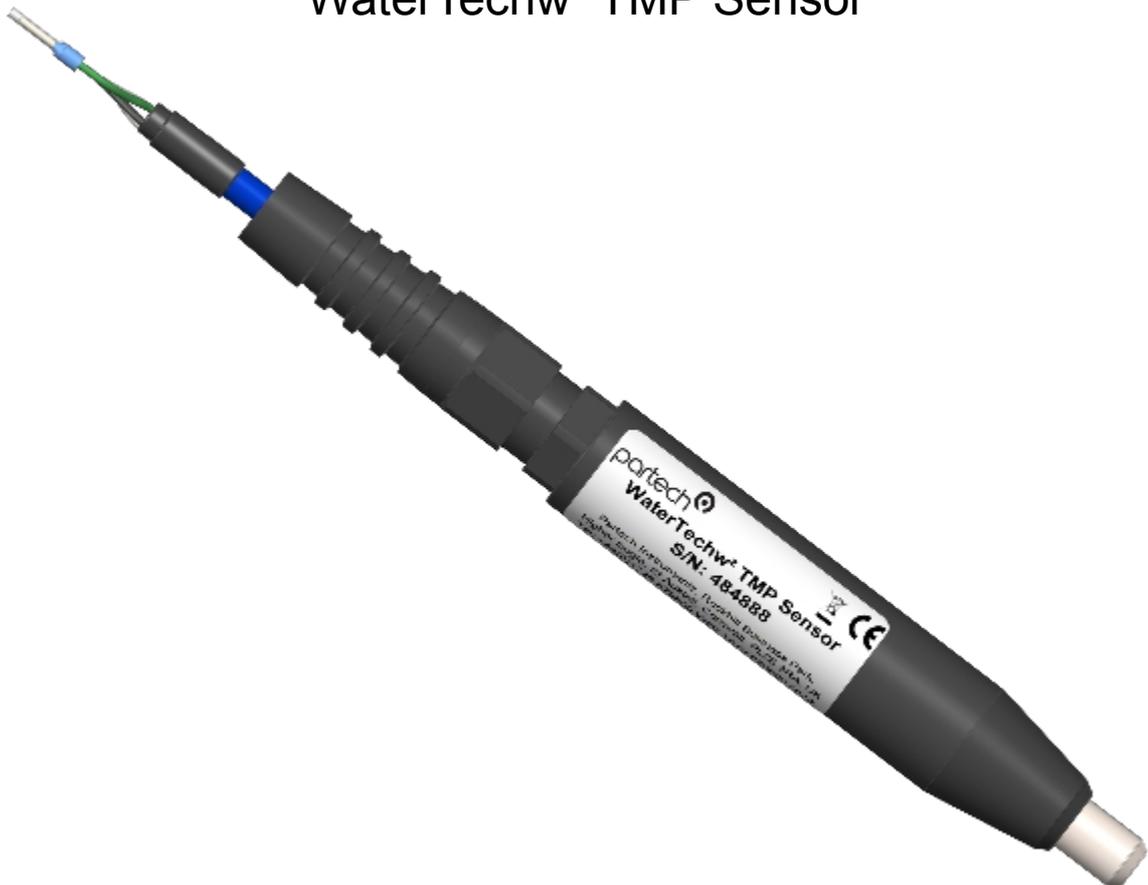
1 Foreword

The WaterTechw² family of sensors are the latest version of water quality monitoring sensors offered by Partech. The 'w²' in the product title denotes compatibility with the Waterwatch² range. The sensors are designed for use with the 7300w² Monitor. The term WaterTech is used for any Partech sensor not under the banner of; turbidity, suspended solids, oxygen, oil on water, or UV measurements.

The WaterTechw² TMP Sensor has been specifically designed to monitor temperature. The result is a robust, accurate, easy to use and stable temperature measurement system. The probes are filled with a special cast resin that protects against moisture. As standard the probes are fitted with 10 m cable, but they can be supplied with other lengths on request. The sensor within the probe consists of a metal cylinder containing an integrated semiconductor precision temperature sensor with 16-bit ADC. The sensor tip is fitted into a black plastic housing. The probes are designed for use between -10°C and +80°. The accuracy of the measurement is +/- 0.3°C.

The sensor requires very little maintenance, with no special tools or training required. The probe has been factory calibrated so does not require further calibration.

WaterTechw² TMP Sensor



2 Introduction

2.1 Manual Conventions

All dimensions stated in this manual are in millimetres unless otherwise stated.

The manual has been written assuming the user has a knowledge of instrumentation and an understanding of the type of measurement being made. Training in the use of the 7300w² Monitor and sensors can be provided, please contact Partech for further information.

Icons have been used throughout this manual to draw your attention to precautions and useful notes.

They are categorised in the following way-



GENERAL NOTES – Specifications and general notes of interest to the user.



GENERAL CAUTION – Used where caution is required to prevent injury, damage, corruption of data, loss of calibration or invalidation of warranty etc.



INSTALLATION NOTES – General installation notes of interest to the installer.



ELECTRICAL CAUTION – Used where there is a danger of electric shock to the installer or end user, or where caution is required to prevent damage to the instrument.



MAINTENANCE NOTES – Used to highlight recommended maintenance procedures and help with fault finding.



ENVIRONMENTAL NOTES – General notes on environmental issues, waste and disposal.

2.2 WaterWatch² Trademark

WaterWatchw² is the family name for the w² range of monitors and sensors. Sensors and instruments designed for specific use with the 7300w² Monitor will be suffixed with the w² trademark.

2.3 Scope of Manual

This manual describes the installation, configuration, testing and operation of the WaterTechw² TMP Sensor. Please refer to 7300w² Monitor manual for standard functions of the 7300w² Monitor.

2.4 External Sensors

External sensors refers to any sensors, expansion modules or instruments connected externally to the 7300w² Monitor.

3 Safety Precautions



3.1 General

Read the safety precautions carefully.

Check the delivery of your WaterWatch² sensor for damage. Any damage should be reported to your supplier as soon as possible.

Use care when unpacking the sensor. **NEVER** use sharp instruments to open the packaging, as this can cause damage to the sensor or cable.

Only use accessories specifically manufactured by Partech for use with this sensor.

Read the operating instructions carefully before installing and operating this sensor.

Keep the cable connections dry and free from contamination during installation.

Keep the sensor away from high voltage cables.



3.2 Electrical installation



Only suitably qualified personnel or a competent person may install, operate or repair this equipment. The installer must ensure all electrical installations comply with local wiring regulations and standards (refer to BS7671 for UK installations).

Please check the sensor has been wired correctly. Incorrect wiring may cause damage to the sensor or monitor.

The WaterWatch² family of sensors are designed exclusively for use with the 7300w² Monitor. DO NOT connect to other monitors.

Sensors may need to be correctly addressed to the monitor before use. Please read the *Sensor Configuration* section of this manual for full details.



3.3 Operating

Because these sensors have a wide range of applications, users must acquire the appropriate knowledge to use these sensors in their specific application.

Partech are always available to provide advice and assistance in your application. Please contact Partech for further information.



3.4 Service and Maintenance

Before maintenance, this equipment must be isolated or disconnected from HAZARDOUS LIVE voltages before access.

Maintenance for the WaterTechw² sensor should be carried out as specified in this instruction manual. Failure to carry out regular maintenance could invalidate the Warranty.

Services and repairs must be carried out by a Partech engineer. Partech can provide a service contract for your system. Please ask for details.



3.5 End of Life Disposal

Equipment should be recycled according to local regulations.

Partech can provide recycling and disposal of your old Partech equipment, and may also provide the same service for other manufactures equipment when replaced with Partech equipment.

Partech may provide a trade-in for old Partech equipment when upgrading your system. Please contact us for further information.

4 Mechanical Installation

Whilst every attempt has been made to ensure that these instructions are correct, common sense and good engineering practice should always be used, as every installation can present a new set of challenges and difficulties. If you are in any doubt please contact Partech or your local distributor for further information.

4.1 Operation Limits

4.1.1 Temperature

The upper operational temperature limit is restricted to 80°C. At low temperatures the limit of operation is -10°C with the practical limitation being ice formation in the sample.

4.1.2 Pressure

The sensor provided is not intended for high-pressure applications and should not be subjected to internal pressures in excess of 2 Bar.

4.1.3 Material Compatibility

Care should also be taken to ensure material compatibility between the media being monitored and the wetted parts of the assembly. The principle wetted parts are black Acetal Co-Polymer, Polypropylene. If you are in any doubt about chemical compatibility please contact Partech.

Regulations governing the use of equipment in contact with potable water exist and these need to be understood by the user of this product. It is Partech's belief that the low surface area in contact with the potable water and the normal installation practise of feeding the sample stream to waste mean that this product is suitable for use in potable water treatment processing.

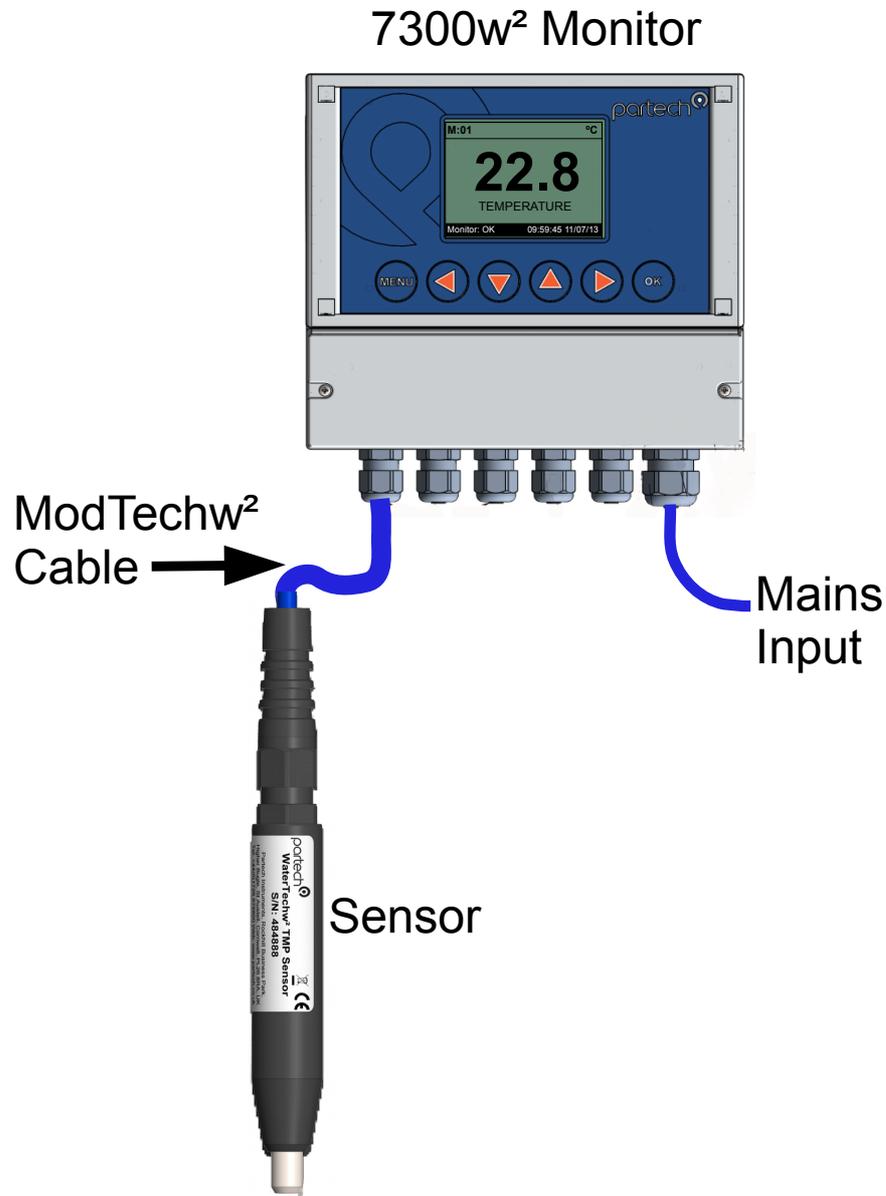
4.2 Sensor Components

The WaterTechw² TMP Sensor comprises of a RS484 temperature transmitter, complying with the same protocol on all Partech ModTechw² sensors.



5 Electrical Installation

5.1 Connection Overview



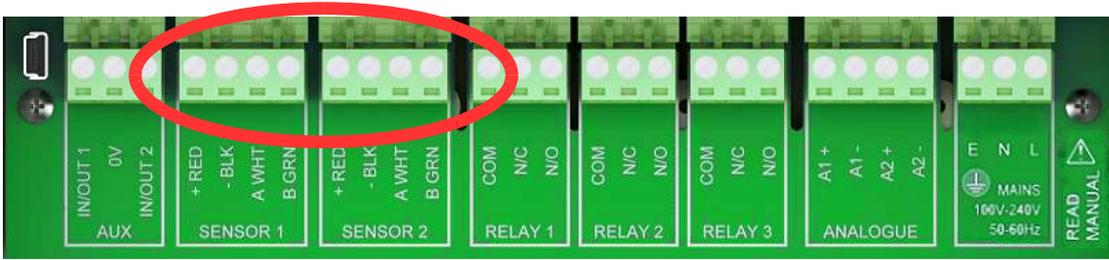
5.2 Electrical Installation



Unscrew the two cover screws on the lower panel of the 7300w² Monitor to reveal the Terminals. Each terminal strip is labelled as illustrated below. (This equipment must be isolated or disconnected from HAZARDOUS LIVE voltages before access). Refer to the 7300w² Monitor user manual for full description of all the terminals within the monitor. The maximum size wire that can be terminated is 2.5mm² CSA. All the connections are via removable Plug/Socket terminals. To disengage the terminal strip, simply pull down to release.

5.2.1 7300w² Connections

A maximum of two sensors can be directly connected to the standard 7300w² Monitor, additional sensors can be added using the optional expansion boxes available separately.



When routing the sensor interface cables, please ensure the cable is separated from any mains cables. Although the Partech w² sensors have a high resistance to interference, separation of mains and data cables is good practice and should always be followed where practical.

All sensors in the w² range communicate with the monitor using the ModTechw² Protocol. This protocol has been specifically designed to take advantage of the advanced features and diagnostics designed into the w² range of sensors.

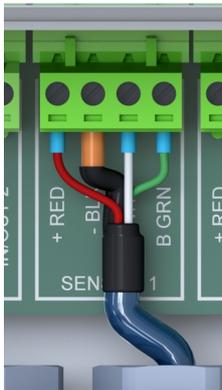
5.2.2 Sensor Interface ModTechw² Connections

Note- These sensors can **NOT** be used with other monitors that are not included in the w² family.

All sensors within the w² family of instruments are connected to the 7300w² Monitor using the same 4 wire configuration.

- RED and BLACK wires provide the 12VDC supply to the sensor.
- WHITE and GREEN provide data communication.

Remove the 4-way connector from the 7300w² Monitor by pulling downwards to disconnect for easy access to the connections. Connect the sensor cores as follows-



(Terminals from left to right on the 4 way connector)

- | | | |
|----------------|---|----------------|
| Term 1 (Left) | - | RED (+12V) |
| Term 2 | - | Black (0V) |
| Term 3 | - | White (Data A) |
| Term 4 (Right) | - | Green (Data B) |

Always connect the screen drain wire with the Black (Term 2). Illustration Left (7300w²) shows drain wire and Black wire connected together, and covered in Black Heat shrink.

5.2.3 Extending ModTechw² Cables

Sensors are usually supplied with 10M cables (longer cables can be provided if requested). These cables can be extended to a maximum length of 100M. To ensure optimum performance, only use Partech ModTechw² cable for extensions. Partech can supply junction boxes to allow for cable extensions. These should be used on all installations where the cable length from the sensor to the monitor exceeds 20M (Partech Junction boxes include on-board filtering for long cable lengths). Junction boxes are also useful for local connection of sensors close to the sample point. This allows for easy replacement of sensors without the need to pull back cables to the monitor. The junction box has an on-board terminator switch that can be activated to terminate the network if the sensor is to be removed for long periods.

When joining cables, ensure the connection is fully waterproof. Any moisture ingress can effect the communication between the sensor and monitor.

ModTechw² Cable specification-

- 2 Twisted Pair - Red/Black (Power) and Green/White (Data) with Screen and Drain wire
- Cores 24AWG (0,22mm²) 7 x 0,20mm
- Outer Insulation – PUR Polyurethane Blue (RAL5003), Diameter – 5mmØ

6 Sensor Configuration

Before attempting to configure the sensor, please read the user manual that came with your monitor. The monitor manual will introduce you to the basic set-up of the monitor, and will familiarise you with the monitor menu structure and buttons.

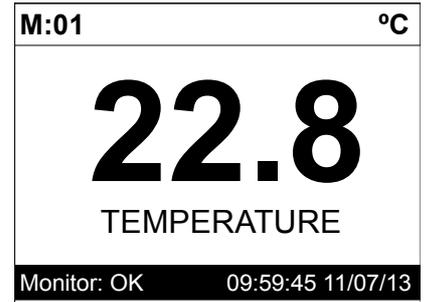
The monitor leaves the factory with no sensors pre-installed.

Assuming the monitor has been physically connected to a sensor, the next step is to register and configure the sensor before any measurements can be made. A single sensor may provide one or more measurements. We advise only connecting one sensor at a time. Once the first sensor has been registered, connect the second and register again. Repeat for any additional sensors.

If a second sensor of the same type is to be used the Modbus address of the first device must be changed to avoid a conflict. Care must be taken to ensure that this Modbus address is not in use by another device. Addresses 1-8 are the best choice.

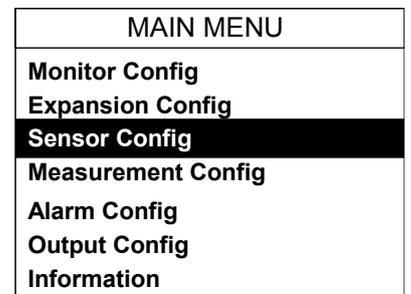
All sensors must be registered to the monitor in this way, even if they are different types.

Please note that live measurements are not available until the Sensor Configuration stage has been completed.



6.1 Sensor Config

From the MAIN MENU screen, select SENSOR CONFIG by pressing  , and press  to accept.



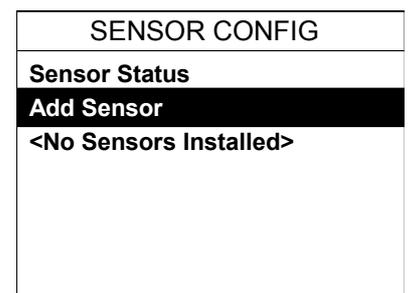
6.2 Sensor Status

This option allows the user to review the current status of the 8 sensor channels, these will all be set to disabled until a sensor is added.

Once a sensor has been installed the display will be updated to indicate the sensor type installed and it's status.

6.3 Add Sensor

1. From the MAIN MENU screen, select SENSOR CONFIG by pressing  and press .
2. The SENSOR MENU should be displayed. Press  to highlight ADD SENSOR, and press .
3. The Monitor will now search all possible addresses (0 to 240) to find any attached sensors. During the search, any sensors found will be displayed momentarily before continuing with the search.
4. Once the search is complete, the Monitor will display a list of sensors found. Each sensor will be automatically allocated a sensor number from S:01 to S:08.
5. Repeat the above process to install a second, third or more sensors. A total of 8 sensors are possible (expansion box may be required to add additional sensors).
6. Sensor addition is now complete.
7. If a single or multiple sensors have been found the  can be pressed to escape from continuing the search.



6.4 S:0x WT^w Temperature

Once the sensor has been added and registered, the monitor will provide a list of functions specific to the sensor. Press or to select the sensor and press . The CONFIG MENU will display a list of sensor functions.

6.4.1 S:0x Info

This function provides a range of diagnostic information that may be requested by Partech for fault finding. Press the key to access the information sub-menu.

Only the first two pages of this sub-menu are shown as they are deemed the most relevant for initial diagnosis.

The **first** page of this information menu option shows the sensor type, Modbus address and the sensor serial number.

Press the key to access the next page.

The **second** page displays the installed firmware version numbers and the factory date.

Press the key to escape from this sub-menu.

This will return us to the Sensor Config. Menu again.

6.4.2 S:0x Remove



This allows the sensor to be removed for re-configuration of the monitor or if a sensor has been added in error. If a sensor has been replaced with a new sensor, the old sensor must be removed before the new sensor is installed.

You will be prompted with 'Are you sure?' before the sensor is removed.

Press to accept and remove.

6.4.3 S:0x Modbus Address

This option allows manual adjustment of the ModTechw² address for the sensor, under normal circumstances this should not be changed.

If a second WaterTechw² TMP sensor is to be added the Modbus address must be changed: Sensors with the same Modbus address connected to the same monitor will cause a communication conflict.

| |
|--|
| SENSOR CONFIG |
| Sensor Status |
| Add Sensor |
| S:01 WT^w Temperature |
| |

| |
|---------------------|
| S:01 CONFIG |
| S:01 Info |
| S:01 Remove |
| S:01 Modbus Address |
| |

| | |
|-----------------------------------|-----------------------------|
| S:01 INFO | |
| Type | WT ^w Temperature |
| SN | 423566 |
| Address | 46 |
| Status | 0x00000000 |
| Status String | OK |
| Press OK or MENU to Exit Page 1/5 | |

| | |
|-----------------------------------|------------------|
| S:01 INFO | |
| Sensor F/W | v1.01.62 |
| Factory Date | 11/02/2017 10:29 |
| Press OK or MENU to Exit Page 2/5 | |

| |
|---------------------|
| S:01 CONFIG |
| S:01 Info |
| S:01 Remove |
| S:01 Modbus Address |
| |

| |
|----------------------------|
| S:01 CONFIG |
| S:01 Info |
| S:01 Remove |
| S:01 Modbus Address |
| |

7 Measurement Configuration

The monitor leaves the factory without any measurements configured. Measurements can only be added after installing the relevant sensor(s).

Once the sensor has been registered with the monitor and installed, the default measurement will be added automatically, the measurement can be configured by following these steps.

7.1 Measurement Config

From the MAIN MENU screen, select MEASUREMENT CONFIG by pressing , press . The screen shot to the left shows the default configuration after the installation of the WaterTechw² TMP sensor on a single sensor configuration:

| |
|-----------------------------------|
| MEASUREMENT CONFIG |
| Measurement Status |
| Add Measurement |
| M:01 Temperature °C (S:01) |
| |

M:01 = Temperature (S:01)

7.1.1 Measurement Status

This option allows the user to review the current status of the 16 measurement channels, these will all be set to disabled until a sensor is added. In the example above the first channel will be occupied.

Once a measurement has been configured the display will be updated to indicate the measurement and it's status.

7.1.2 Add Measurement

The WaterTechw² TMP Sensor is a single measurement sensor, therefore there should be no need to add other measurements, unless alternative temperature units are desired, or the measurement has been removed in error the following procedure will allow the measurement to be returned.

1. The MEASUREMENT MENU should be displayed. Press  to highlight ADD MEASUREMENT, and press .
2. The temperature measurement options will be displayed. Press  to select desired units.
3. Press  to confirm the selected measurement.
4. The measurement will be allocated a measurement number from M:01 – M:16. A total of 16 measurements may be displayed.
5. Press  to return back to the display screen. Your first measurement configured should now be displayed. If two measurements were configured, press  to cycle through the display screens to show 2 measurements, 3 measurements etc.

| |
|--------------------|
| MEASUREMENT CONFIG |
| Measurement Status |
| Add Measurement |
| |

| |
|---|
| ADD MEASUREMENT |
| S:01 Temperature °C Wtw Temperature SN: 483264 Range -10.0 to 80°C |
| S:01 Temperature °F Wtw Temperature SN: 483264 Range -10.0 to 80°C |
| S:01 Temperature K Wtw Temperature SN: 483264 Range -10.0 to 80°C |

The Measurement Menu will list all configured measurements in order M:01 to M:16 the list will also indicate the sensor number that is delivering the signal for the measurement.

| |
|-----------------------------------|
| MEASUREMENT CONFIG |
| Measurement Status |
| Add Measurement |
| M:01 Temperature °C (S:01) |
| M:02 Temperature °F (S:01) |
| |

7.2 M:0x – Measurement Setup

Selecting a measurement will reveal a new sub-menu associated with that measurement. In **MEASUREMENT CONFIG** press to highlight the required measurement and press .

| MEASUREMENT CONFIG |
|-----------------------------------|
| Measurement Status |
| Add Measurement |
| M:01 Temperature °C (S:01) |
| |

7.2.1 M:0x Info

This option provides additional information on the measurement, this information will only be required if a problem exists with the instrument performance.

7.2.2 M:0x Title

This allows the title of the measurement to be changed from it's default, the measurement title is used in measurement mode to identify the measured value. A selection of standard terms are available along with a 'User Defined' option that can be adjusted to suit your requirements. For example this could be changed to 'Temperature Line 1'. The maximum number of characters is 20.

| M:01 CONFIG |
|-----------------------|
| M:01 Info |
| M:01 Title |
| M:01 Averaging |
| M:01 Remove |
| M:01 Display Position |

7.2.3 M:0x Averaging

This allows the user to impose averaging on the measured value, this is used to reduce the speed of reaction to the process changes.

The following values are available for the user to select:

| Damping Rate | Response Time (Seconds) | Typical Use |
|--------------|-------------------------|---|
| Instant | 0.2s | Instrument demonstration and test |
| Very Fast | 1s | Applications with dynamic temperature changes |
| Fast | 10s | Normal expected operational use |
| Medium | 30s | |
| Slow | 1m | |
| Very Slow | 2m | Reduce spurious alarms from brief temperature changes |

7.2.4 M:0x Remove

This allows the user to remove a measurement that has been selected in error or to allow re-configuration of the system. Please use this option with care, all user settings will be lost if the measurement is removed in error.

7.2.5 M:0x Display Position

This option allows the position of the measurement to be moved. For example the Temperature measurement can be changed from M:01 to M:02 so it will appear second on the list in MEASUREMENT CONFIG menu. Any associated alarms and outputs will automatically move with the renumbered measurements.



8 Maintenance

8.1 General cleaning

Monthly, or as required, check the measurement cell for fouling. The sensor is easily accessed, by removing from the measurement point to view sensor end. Check the body for debris or biological fouling and clean as required.

8.2 Inspection

Make a routine check of any cable connections or terminations.

8.3 Dismantling the Sensor

The sensor is fully encapsulated and has no removable or serviceable parts.



9 Sensor Faults

9.1 Unstable reading on controller

The following can cause an unstable display value:

- Bad connection in the sensor cable - check all connections are secured.

9.2 Error Codes from 7300w² Monitor

Please refer to the 7300w² Monitor manual for further information.

9.2.1 Over range/Under range

This indicates that the measured value is outside the normal operating limits of the sensor. This could be caused by a sensor fault but can also indicate a genuine over or under range condition.

The following action is recommended:

1. Remove sensor from measurement point
2. Place the sensor in a water sample at significantly different temperature

At each stage observe the behaviour of the displayed value. If the error message clears then it is possible that the problem was caused by a genuine over or under range condition.

If the problem persists please contact Partech or your local representative for further guidance.

10 Technical Support

Technical Support is available by phone, fax, or email, the details of which are shown below.

- Phone: +44 (0) 1726 879800
- Fax: +44 (0) 1726 879801
- Email: techsupport@partech.co.uk
- Website: www.partech.co.uk

To enable us to provide quick and accurate technical support please have the following information ready when you contact us:

- Serial Number or original purchase details
- Sensor Type, and Serial Number
- Application details
- Description of fault

10.1 Returning Equipment for Repair

If equipment needs to be returned to Partech for repair or service the following address should be used:

SERVICE DEPARTMENT
PARTECH INSTRUMENTS
ROCKHILL BUSINESS PARK
HIGHER BUGLE
ST AUSTELL
CORNWALL
PL26 8RA
UNITED KINGDOM

Please include the following information with the returned equipment. Also ensure that sensors are adequately protected for transportation (Advice on packing can be provided by our service department).

- Contact name and phone number
- Return address for equipment
- Description of fault or service required
- Any special safety precautions because of nature of application



11 Technical Specification

11.1 Electrical

Supply..... 12VDC from 7300w² Monitor to Temperature sensor

Sensor Communication..... ModTechw² Protocol (Specifically developed for WaterWatch² range)

11.2 Measurement – Temperature Sensor

Construction..... Sensor tip 8mm dia. x 10 mm. Body 28 mm dia. Total length with cable gland 152 mm.

Material..... Stainless steel tip and black acetyl body.

Cable..... Standard cable length 10m - 4 Core, 2 Twisted Pair, 5mm O/D Polyurethane Coated

Operating temperature..... Standard range: -10°C to +80°C.

Maximum depth rating..... 2 metres

Calibration..... Not required

Minimum..... -10°C

Maximum..... +80°C

Accuracy..... +/- 0.3°C

Response Time..... 18 seconds (60% of target reading)

Reading update min..... 500 millisecond.

