

***TOIP*** *Pty*  
*Ltd*  
*Telemetry Over Internet Protocol*

**User Manual**

**WMI**

**SDI-12 Tension Sensor Interface**

Version 1.1

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# Table of Contents

1 WMI Introduction.....	3
2 Specifications.....	4
3 Installation and Configuration.....	5
4 Supported Commands.....	9
5 Warranty.....	10

# 1 WMI Introduction

This manual is written for the WMI, a 4 channel gypsum block interface.

The WMI may be used with either the Irrometer manufactured “Watermark” sensors or the GBHeavy / Malvic sensors. Selection of which type of sensor is in use is made with a simple extended SDI-12 command.

The WMI is built into a small polycarbonate enclosure which is fitted with a breather vent on the top surface and two cable glands on the bottom (through which the cables for connection to the sensors and logger are run). A mounting bracket is fitted to the rear of the case to support mounting of the unit to a post.



## 2 Specifications

<b>Parameter</b>	<b>Value / Range</b>	<b>Comment</b>
Dimensions	81 x 79 x 56 mm	
Environmental rating	IP66 Polycarbonate enclosure	Breather vent fitted
Sensor connections	Screw Terminals	Removable header connector
Power Source	Nominal 12V DC	From SDI-12 logger / telemetry
Operating Range	-20 to + 60 °C	
Inputs	4 off Resistance	AC Excitation
Range	0 to 200 kPa 0 to 500 kPa	Watermark Malvic
SDI-12 Address	0 (default)	Range 0 to 9, A-Z, a-z

### 3 Installation and Configuration

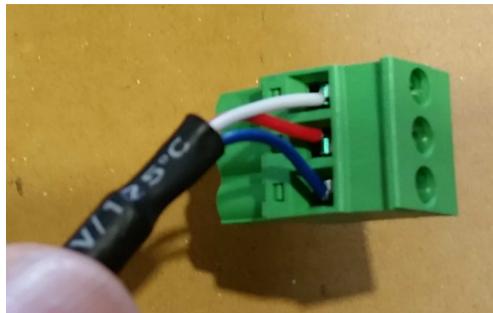
Prior to installation, determine what sort of sensors you will be working with: Watermark or Malvic. Install the sensors at the required depths and bring the sensor wires to the surface, making sure you have at least 450mm of spare cable.

Using a permanent marker, mark the cables with either a number or 1 to 4 lines so that you can identify them (the lowest number always representing the shallowest sensor).

#### 3.1 Connection to SDI-12 device

The interface must be connected to the SDI-12 device via the header on connector X1:

- lift the header off of the PCB socket to make it easier to connect your wire
- back off the screws on the header a couple of turns
- run the cable from your SDI-12 device (telemetry unit or data logger) through the smaller cable gland on the bottom of the WMI
- strip and tin the ends of the wires
- place the wires from your SDI-12 device into the 3 pins:



Pin 3	(left)	SDI-12 Data	White
Pin 2		Power	Red
Pin 1		Ground	Black

- place the header back in to position.

## 3.2 Configuration

The Interface must be configured to suit the type of sensors which will be used with it. The configuration is completed using an extended SDI-12 command. This can be sent using a USB to SDI-12 converter or using Direct Command mode from a telemetry unit or logger which supports the function.

### 3.2.1 To find the address for the interface ?!

?! scan SDI-12 bus for any connected sensors

Example: Query bus

```
?! Scan bus for sensors
0 Sensor responded on address 0
```

### 3.2.2 To check the sensor type aXGT!

<add>XGT! displays current sensor type

returns <add><current type>

Example: Check the current type selection:

```
0XGT! Query sensor type
00 Address 0 has Type 0 selected
(Watermark)
```

### 3.2.3 To set the sensor type aXSTn!

<add>XST<type>! sets sensor type to Watermark or Malvic  
type = 0 = Watermark; type=1 = Malvic

returns <add>type:<current type> CR LF

Example: Set the type to 1 (Malvic / GB Heavy)  
0XST1! Set type to 1 (Malvic / GB Heavy)  
01 Address 0 has Type 1 selected

### 3.3 Connection to Sensors

The sensors connect to the 8 pin header which plugs in to the socket labelled X2 on the PCB:

- lift the header off from the connector
- back off the screws on the individual contacts
- run the cables from your gypsum block sensors through the large cable gland
- 4 of the figure 8 cables should fit comfortably through the gland
- cut the cables to length, allowing a small goose neck inside the case: you may need to re-mark them before you shorten them
- strip and tin the ends of the wires
- pull the cables back out of the gland 25mm or so and wrap some insulation tape around the cables to hold them together and make the bundle more circular. Then push the cables back in so that the tape is in the glands rubber seal. Tighten the gland's lock nut
- place the wires in the corresponding screw terminals on the header:



8	<b>Sensor 4</b>
7	"
6	<b>Sensor 3</b>
5	"
4	<b>Sensor 2</b>
3	"
2	<b>Sensor 1</b>
1	"

#### 3.3.1 Make a Test Measurement **aM! / aC!**

You should now make a test measurement to confirm that you can see all of the sensors

- with no sensors connected or with the sensors air dry, you will get a maximum scale reading (e.g. 200 for the Watermark sensors)
- if you have installed the sensors wet (as is the recommended practice) you should see very low tension readings

Example: Read air dry sensors

OM!  
00014  
ODO!  
0-200-200-200-200

Example: read sensors in the ground

OM!  
00014  
ODO!  
0-60-26-182-286

### **3.4 Mounting**

The WMI is fitted with an aluminium bracket which can be used to fix to unit to a post. A stainless steel hose clamp is supplied to secure the unit to the post.

## 4 Supported Commands

Command	Comment	Example
a!	Returns sensor information string	<b>0!</b> I13TainElec1000001.0
aAb!	Changes address from a to b Address range = 0 to 9 Sensor responds with new address	<b>0A1!</b> 1
aM!	Default measurement Reads sensors Returns address, number of seconds to wait & number of values	<b>0M!</b> 00014
aC!	Default concurrent measurement Reads sensors Returns address, number of seconds to wait & number of values	<b>0C!</b> 000104
aD0!	Fetch values	<b>0D0!</b> 0-200-200-200-200
aXSTn	Set sensor type Returns address and new type n = 0 Watermark, 1 Malvic	<b>0XST0!</b> 00  <b>0XST1!</b> 01
aXGT	Read sensor type selection Returns current type selection	<b>0XGT!</b> 00

## **5 Warranty**

The WMI is covered by a one (1) year warranty.

Warranty is available on a return to base basis only. End users must pay for return shipment of faulty products either TOIP Pty Ltd or their local distributor. If the unit is assessed by TOIP Pty Ltd and found to be a warranty failure, it will be replaced free of charge TOIP Pty Ltd will pay the return shipment to the owner.

The warranty does not cover mechanical damage, damage inflicted during installation or removal or damage caused by animals.

Prior to using the product, please ensure that you read, understand and accept the Warranty Statement. If you do not accept the conditions of the Warranty Statement, please return the probe for a refund.