



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

# **AgriMet Weather Station**

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# 1 System Configuration

The AgriMet Weather Station has been designed to meet the need for a reliable weather station which is suitable for a range of agricultural applications.

The system is built up using the following components:

- Aluminium tripod base
- YDOC ML417 telemetry unit with 5W solar panel
- HT05/06 combination air temperature and relative humidity sensor with radiation screen
- SDI\_WS-WD wind speed and wind direction sensors with holders
- RG-AGRI tipping spoon rain gauge.

As an option the following sensors may also be added:

- SR Solar radiation sensor
- LWS Leaf wetness sensor
- HTP05/06 Temp RH with barometric pressure
- RG-SS Stainless steel tipping bucket rain gauge

The station is designed to transfer data over the mobile phone network and should thus be installed in locations with mobile phone coverage on the 4G mobile network. The YDOC RTU operates on the narrow band Cat M1 and/or NB1 service, which has much longer range than standard 4G transmissions, so on-site checks should be completed with a device using one of these protocols rather than a normal handset.

## **2 Deploying the Station**

### **2.1 Tools required for installation**

To install the station you will require the following tools:

- Tarpaulin
- 8mm nut driver for hose clamps
- 150mm side cutters (to trim cable ties to length)
- Spirit level
- Compass (and from maps, knowledge of correction from true to magnetic north for the site) or hand held GPS
- Post hole digger and 25kg bag of pre-mix concrete or 3 off 300x300x40 paving blocks

### **2.2 Mounting Method**

The completed station will be mounted on an aluminium tripod. The legs may be bolted to concrete pads poured for the purpose or to paving blocks.

### **2.3 Unpacking**

Check the contents of your package. You should have received:

- 1 off ML417 telemetry unit
- 1 off 5W solar panel
- 1 off aluminium tripod
- Sensors as ordered.

### **2.4 Pre-Installation**

Choose site for installation:

- This should be on flat ground and be as representative of conditions on the site as possible
- The site should have a clearance of 10 times the height of any up-wind obstacles and 5 times the height of any down-wind obstacles.

Unpack the station:

- Remove the station from its packing and lay it on the ground on the tarpaulin
- Unpack the components and assemble the tripod
- Stand the tripod on the ground with one leg facing north. Use the compass or GPS to identify true north. The easiest method is to record the GPS coordinates of the site and then walk a distance of 100 to 200m in an approximately north direction. Then walk in an arc from side to side until you identify a spot where the longitude is exactly the same as that at the tripod site
- mark the position of the 3 legs
- if using concrete, dig 3 holes each 250mm in diameter and 200mm deep. An ice cream bucket with the base cut off can be used as a former. Pour in the dry concrete mix and use a spirit level to ensure all sites are level. Place a dyna-bolt in the hole through each leg, secure them with a nut turned finger tight and then lower the tripod in to position. Work the dyna-bolts into the concrete, ensuring you re-pack the mix around the dyna-bolts. Make sure the tripod is still level. Wet up the concrete mix and level off the surface with a trowel
- if using paving blocks, drill a hole in the centre of each block and fit the dynabolts. Using the tripod as a template, mark out the locations for each block and dig out the soil to the same depth as the block height (you can use some sand to help with levelling). Position the blocks in place and make sure they are level. Fit the tripod legs over the dyna-bolts and lock them in position using the nuts.

## **2.5 Install RTU**

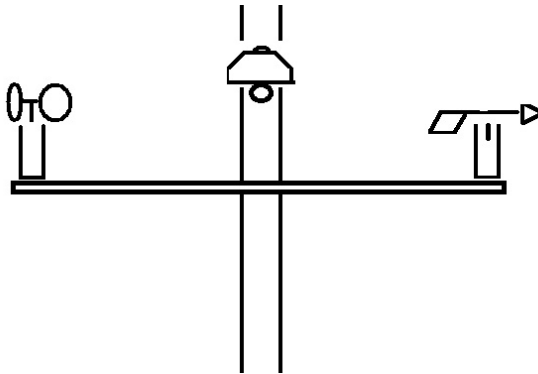
Mount the RTU and solar panel:

- Identify the pole which you will be using as the top section
- Remove the ML417 and solar panel from their packaging and secure them back to tripod at eye level: the solar panel should be positioned on the north side of the pole and the ML417 on the south.

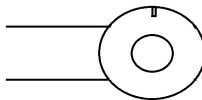
## 2.6 Install Sensors

Wind speed and direction

- The wind speed and direction sensors should be mounted on the holders and set at a height of 2m above ground level



- Carefully unpack the two sensors from their boxes
- Fit two hose clamps over the top of the pole and insert the WS on the east side and the WD on the west
- Tighten the clamps to the point where they just start to lock
- Adjust the two holders so the arms are in a straight line and finish tightening the hose clamps
- Align the wind direction sensor so that the mark on the body faces true north

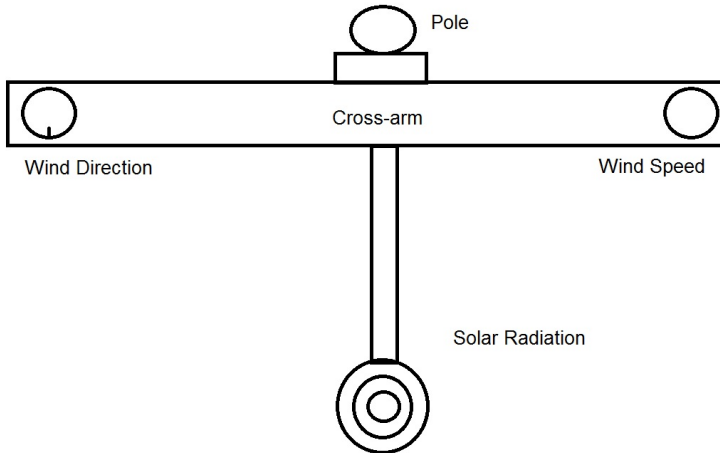


- Slide the u-brackets up over the pole and, after aligning the bracket in the correct orientation, tighten the clamp nuts.

Solar Radiation (where fitted):

- solar radiation sensors should be installed at a nominal height of 2m above ground level

- as the wind speed and direction sensors are installed at this height, the solar radiation sensor should be mounted 200m below that and with the sensor facing north.

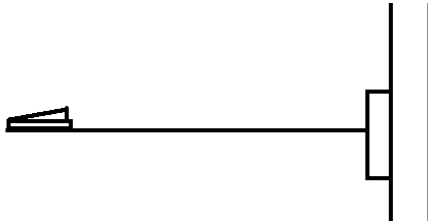


#### Air Temperature & Relative Humidity

- The SDI-TRH sensor is nominally installed at a height of 1.2 m above ground level
- Follow the assembly instructions in the SDI-TRH sensor manual to assemble the radiation screen
- Mount the screen to the post using the u-bracket and the supplied screws

## Leaf Wetness

- The leaf wetness sensor should be installed at the typical canopy height
- You may need to move the sensor up and down as the crop grows



## 2.6.1 Wiring

Run the cables from the sensors down the tripod post and into the cable glands on the base of the enclosure. If your station uses the smaller YDOC case, run the cables into the TBS04 Junction box.

Terminate the sensors on the Junction board (large enclosure) or on the TBS04 PCB (small enclosure).

## 3 Checking The System

### 3.1 Power

Ensure the power supply is properly connected and the batteries installed:

- SLA Charge Board: connect the 3 pin header from the battery to the 3 pin socket on the bottom of the Charge Board. Connect the 2 pin header from the solar panel to the 2 pin socket on the left side of the charge board

- LFP Charge Board: insert the 4 off 18650 sized LFP batteries into the battery holder. Connect the 2 pin header from the solar panel to the 2 pin socket on the left side of the charge board.

Connect the two core red-black power cable between the socket on the charge board and the matching socket on the ML417 PCB.

### **3.2 Sensor Checks**

Turn on your computer, connect a USB Mini cable to a free USB port and plug the other end of the cable in to the USB Mini socket on the front of the ML417. Open YDOC Terminal and create a Direct comms session to the RTU

- activate the menu
- select 3 Configuration Setup
- select A Serial Port
- from the list of SDI-12 sensors, select each in turn and select T Sensor Test to confirm the RTU can read each sensor
- when that is done, go back to the main menu and select 5 Maintenance Menu
- select 1 Field Testing
- select Digital Port test
- toggle the rain gauge and ensure that the count increments with each tip.

### **3.3 Connectivity Checks**

Confirm that the RTU can connect to the network and send data to the server:

- from the menu select 3 Configuration Setup
- select 2 Modem
- select S Signal strength test and confirm that the unit can connect to the network (it may take a while to register)

- select T APN Test and confirm that the unit can register on the data network
- go back to the Configuration Setup Menu and select D Modem Output
- select 2 FTP
- select T FTP test and confirm that the unit can connect to the server.

### ***3.4 Erase test data on SD card***

Before setting the unit running, erase any test data stored on the unit's memory card:

- from the menu select 5 Maintenance
- select Format SD card
- wait while the format completes
- exit form the menu and allow the unit to go to Logging / Run mode.