

User Manual

Weather Station

Part 1723-1B-2-111 (Firmware Issue 2436 4.00 onwards)

Doc No: 1723-PS-0014

Issue 2



Gill Instruments Limited
Saltmarsh Park, 67 Gosport Street, Lymington,
Hampshire, SO41 9EG, UK
Tel: +44 1590 613500, Fax: +44 1590 613555
Email: anem@gillinstruments.com Website: www.gillinstruments.com

Foreword

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Thank you for purchasing the MetPak manufactured by Gill Instruments Ltd. To achieve optimum performance we recommend that you read the whole of this manual before proceeding with use.

Gill products are in continuous development and therefore specifications may be subject to change and design improvements without prior notice.

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Guarantee

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Warranty is void if the coloured Wind Sensor security seal is damaged or broken, or the Wind Sensor transducer caps have been damaged.

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Cautions and Notes

The following symbols are used in this guide:



CAUTION. This indicates an important operating instruction that should be followed to avoid any potential damage to hardware or property, loss of data, or personal injury.



NOTE. This indicates important information to help you make the best use of this product.

Applicable Parts

MetPak Part 1723-1B-2-111

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1. Introduction

MetPak

MetPak is a compact and lightweight multi-sensor instrument that measures the most essential weather parameters. Gill ultrasonic technology, as used in the proven WindSonic instrument, measures wind speed and direction. Temperature and Humidity are measured and Dewpoint calculated using an industry standard probe housed in a naturally aspirated radiation shield. Barometric pressure is measured using an industry standard sensor.

The instrument is supplied with digital ASCII RS232/RS422/485 (2 wire point to point) and digital SDI-12 outputs. NMEA 0183 and MODBUS RTU/ASCII outputs are also configurable. An electrical hub box is fitted to the mounting bracket allowing convenient termination of all electrical cables.

The instrument uses a rugged mounting clamp that attaches to any vertical pipe from 30mm to 58mm (2.3") diameter.

An electrical hub box is fitted to the mounting bracket for termination of data and power cables.

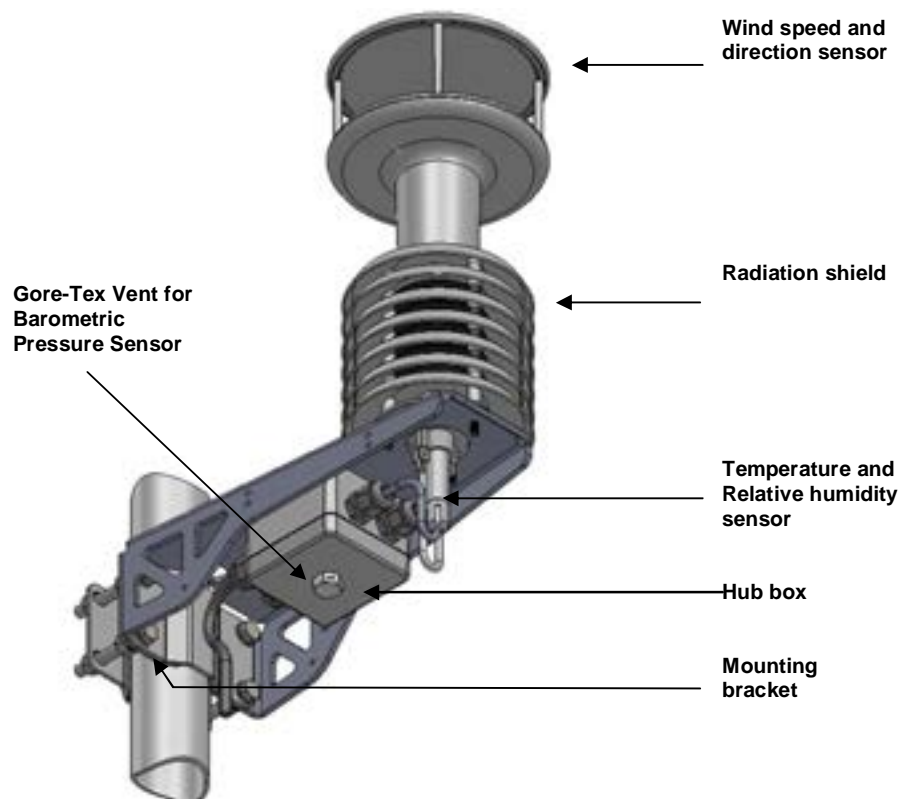


Figure 1 MetPak

1.1 Principle of Operation

1.1.1 Wind Speed and Direction Sensor

The MetPak uses the WindSonic wind speed and direction sensor. The WindSonic measures the times taken for an ultrasonic pulse of sound to travel from the North transducer to the South transducer, and compares it with the time for a pulse to travel from S to N transducer. Likewise times are compared between West and East, and E and W transducer.

If, for example, a North wind is blowing, then the time taken for the pulse to travel from N to S will be faster than from S to N, whereas the W to E, and E to W times will be the same. The wind speed and direction can then be calculated from the differences in the times of flight on each axis. This calculation is independent of factors such as temperature.

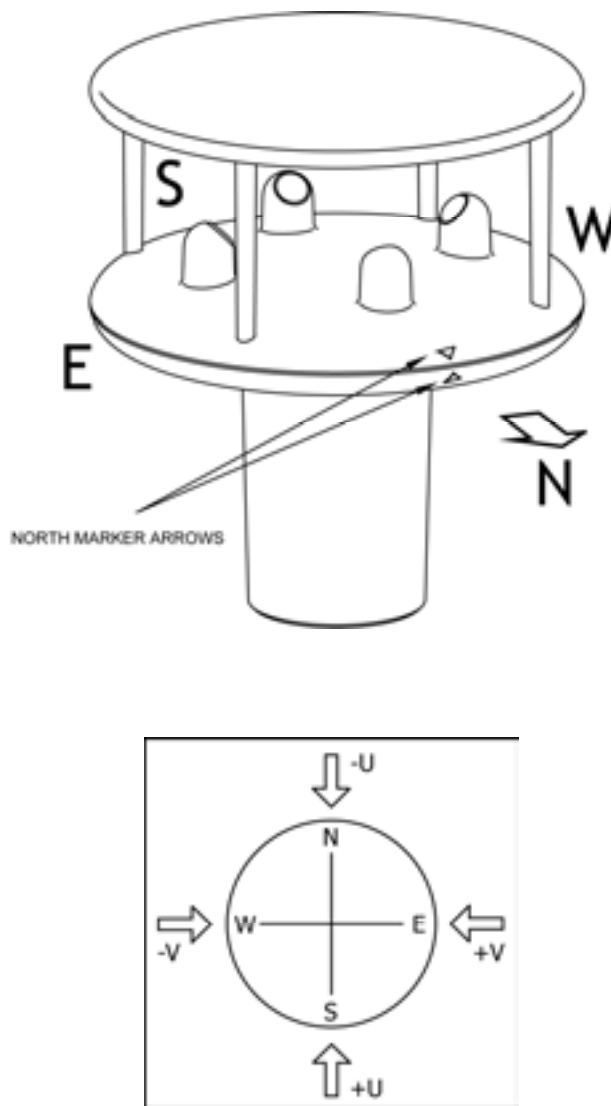


Figure 2 Compass points

Figure 3 shows the compass point and polarity of U and V if the wind components along the U and V axis are blowing in the direction of the respective arrows.

1.1.2 Radiation Shield

A MetSpec Multi-Plate Radiation Shield provides excellent protection to the Rotronics temperature and relative humidity sensor, shielding the probe from unwanted errors, especially from secondary upward reflecting solar radiation and/or wind blown precipitation/airborne contaminants. The special shield plate geometry, with its double louvre design, provides excellent response time performance of quick ambient temperature changes while still working effectively as a baffle to stop larger contaminants such as salt or dirt from reaching the Rotronics probe. Due to the increased protection offered to the Rotronics probe by the MetSpec shield, the maintenance cycle can be extended (see Para 5.2). The shield benefits from very robust material choice and extremely high UV protection requiring no maintenance. A further benefit of the MetSpec shield design is that the measured temperature is now even closer to reference temperature measurements made using artificially aspirated motors without the drawbacks of such systems (power and the maintenance of moving parts).

1.1.3 Temperature and Relative Humidity Sensor with Dewpoint Output

The Rotronic HygroClip module is a complete instrument, with integrated temperature compensation. Calibration data is maintained within the integrated electronics. It provides digital output signals for Relative Humidity, Temperature and Dewpoint to the MetPak Hub box.

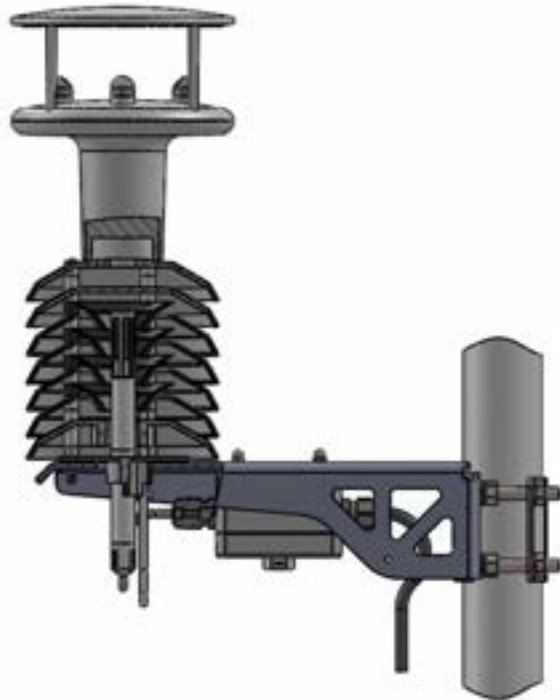


Figure 3 Position of Temperature and Relative Humidity Probe in the Radiation Shield

1.1.4 Barometric Pressure

Barometric pressure output is provided by a solid-state device fitted on to the circuit board in the MetPak hub box. Vent to atmosphere is via a Gore-Tex[®] filter, which protects the pressure sensor from the effects of wind and rain.

1.2 Abbreviations

Table 1 Abbreviations

| Item | Meaning |
|--------|---|
| ASCII | American Standard Code for Information Interchange |
| C | Centigrade |
| CAL | Calibration |
| CD | Compact Disc |
| COM | Communications |
| CR | Carriage Return |
| CSV | Comma Separated Variable |
| ETX | End of String |
| F | Fahrenheight |
| FPM | Feet per Minute |
| HF | High Frequency |
| HPA | Hecto-Pascals |
| HTML | Hyper Text Markup Language |
| Hz | Hertz |
| IMM | International Maritime Mobile |
| In Hg | Inches of Mercury |
| K | Kelvin |
| KPH | Kilometres per Hour |
| KTS | Knots |
| LF | Line Feed |
| M Bar | Milli Bars |
| Max | Maximum |
| MF | Medium Frequency |
| Min | Minimum |
| Mm Hg | Millimetres of Mercury |
| MPH | Miles per Hour |
| MS | Microsoft |
| MS | Metres per Second |
| NMEA | National Marine Electronics Association |
| NSEW | North South East West |
| NVM | Non-Volatile Memory |
| PC | IBM compatible Personal Computer |
| ROM | Read Only Memory |
| RS232 | Communications standard |
| RS422 | Communications standard |
| RTU | Remote Terminal Unit |
| Rx | Receive |
| RXD | Received Data |
| SDI-12 | Serial – Data Interface standard for microprocessor based sensors |
| STX | Start of String |
| Tx | Transmit |
| TXD | Transmitted Data |
| VHF | Very High Frequency |
| WIMWV | Wind Instrument Mean Wind direction and Velocity |
| WIXDR | Wind Instrument Cross track error Dead Reckoning |
| WMO | World Meteorological Organisation |

2. Installation

MetPak has been designed to meet and exceed the stringent standards listed in its specification (see Para 6.1).

2.1 Pre-Installation Checks

As with any sophisticated electronics, good engineering practice should be followed to ensure correct operation:

- Ensure the MetPak will not be affected by other equipment operating locally, which may not conform to current standards, e.g. radio/radar transmitters, generators etc.
- Avoid mounting in the plane of any radar scanner – a vertical separation of at least 2m should be achieved.
- When installing MetPak near radio transmitting antennas, ensure that the mounting position fulfills the following minimum separations (all round):
 - VHF IMM – 1m
 - MF/HF – 5m
 - Satcom – 5m (avoid likely lines of sight)
- Use cables recommended by Gill (see Para 2.2.3). If cables are cut and re-connected incorrectly (perhaps in a junction box) then EMC performance may be compromised if cable screen integrity is not maintained.
- Avoid earth loops – wire the system in accordance with these installation guidelines.
- Ensure that the power supply operates to the MetPak specification (see Para 6.1) at all times.
- Avoid turbulence caused by surrounding structures that will affect the accuracy of the sensors such as trees, masts and buildings. The WMO make the following recommendations. The standard exposure of wind instruments over level open terrain is 10m above the ground. Open terrain is defined as an area where the distance between the sensor and any obstruction is at least 10 times the height of the obstruction.
- Keep away from building exhaust vents, machinery and motors.

2.1.1 Spare Parts

| | |
|-------------|---|
| 1723-10-051 | RS232 to USB 1.8M configuration cable. |
| 1723-PK-024 | Pressure Sensor Filter Spares kit. |
| 1723-PK-025 | Hygroclip Filter Replacement Kit (2 Filters). |

2.2 Installation

2.2.1 Bench system test



Prior to physically mounting the MetPak in its final location, we strongly recommend that a bench system test is carried out to confirm the system is configured correctly, is fully functional and electrically compatible with the selected host system and cabling (preferably utilising the final cable length). The required data format, units, output rate, and other options should also all be set up at this stage.

2.2.2 Equipment Required

1723-1B-2-111 MetPak set for RS232 communication (factory default setting).

1723-10-051 MetPak RS232 to USB 1.8M configuration cable with integral 5v power or alternatively use RS232, RS232 converter and separate 5v to 30 dc power supply.

ES-U-1001-A EasySynch RS232 to USB adaptor or equivalent (if not using Gill part 1723-10-051) or connect directly to an RS232 COM port.

Power Supply 5V to 30Vdc at 50mA if required.

Belden 9503 3 pair cable (if not using Gill Part 1723-10-051), length as required.

Gill MetView Software supplied on the MetPak CD or download from <http://www.gill.co.uk/main/software.html>

2.2.3 Cabling

Communication Cabling

MetPak has five communication connection options:

- USB (using the 1.8m Gill USB cable, Part No. 1723-10-051).
- RS232
- RS422
- RS485 (two wire point to point)
- SDI-12

It is important that the cable is appropriate for the chosen communication network. The following sections describe the recommended types and maximum lengths of cable in each case.

NOTE. A 15-metre, 6-pair cable (wires stripped at each end) suitable for RS232/RS422/485 or SDI-12 communication is available from Gill Instruments (Part No. 1723-10-053).

Cable Type

- Wire type:** 24AWG
- Wire size:** 7x32 AWG.
- Cable outer diameter:** 6-8mm (to match the hub box gland).

For RS422/485 operation the cable should contain twisted pairs screened to match the application.

The following table shows an example manufacturers' reference; other manufacturers' equivalents can be used.

Table 2 Recommended Belden cable types

| Application | No. of Pairs | Belden Ref. |
|------------------------|--------------|-------------|
| SDI-12 | 2 | 9729 |
| Digital RS232 or RS485 | 3 | 9503 |
| Digital RS422 | 4 | 9504 |

Cable length

The maximum cable length is dependent on the chosen communication method.

The following table shows the maximum cable lengths for the supported communication protocols at the given baud rates, using the recommended cable. If any problems of data corruption etc. are experienced, then a slower baud rate should be used. Alternatively, a higher specification cable can be tried.

Table 3 Maximum cable lengths for supported communication networks

| Communication format | Baud rate | Max. cable length |
|----------------------|-----------|-------------------|
| RS232 | 19200 | 6.5M |
| RS422/RS485 | 19200 | 1000M |
| SDI-12 | 1200 | 90M |

Cabling (unused wires)

Any unused wires in the connecting cables should be connected to ground preferably at the user equipment end.

Cabling protection

The Cable should be secured:

- With cable clamps or equivalent at regular intervals such that the hub box cable gland does not support the cable weight.
- Away from the mounting bolts to prevent chaffing of the cable.



NOTE. Install appropriate strain relief support to the cable. If possible, pass the cable through the mounting pole.

Earthing

To ensure correct operation and for maximum protection from lightning, a separate lightning rod system is recommended to protect the system.

You can also earth the MetPak through its mountings or by connecting a grounding cable (minimum of 6mm² copper wire) to a spare MetPak metalwork bolt hole. Clean off any paint that might prevent a good connection.

When you connect the communications cable ensure that the screen has a connection to the hub box case.

Routing Cables through the Hub Box Glands



NOTE: The MetPak Hub Box cable glands contain spring loaded metal leaves that are designed to make a ground contact with cables that have an overall braid screen. Care is therefore required when inserting and removing cables through the glands to prevent damage to the metal leaves.

2.2.4 Communication connections

To connect MetPak:

1. Open MetPak hub box by unfastening the four screws.
2. Locate connector J5 (see Figure 4). Carefully pull the connector off its circuit board pins.
3. Strip the cable wires to 8mm.
4. Pass the cable through one of the gland nuts.
5. Connect your cable as shown in the following diagrams:
 - Gill USB Cable Figure 5
 - RS232 Figure 6
 - RS422 Figure 7
 - RS485 Figure 8
 - SDI-12 Figure 9
6. Ensure the cable screen is grounded through the hub box gland metalwork.
7. After connection, securely tighten the gland nut to prevent moisture ingress.



NOTE. Ensure that MetPak is configured for the chosen communications method.

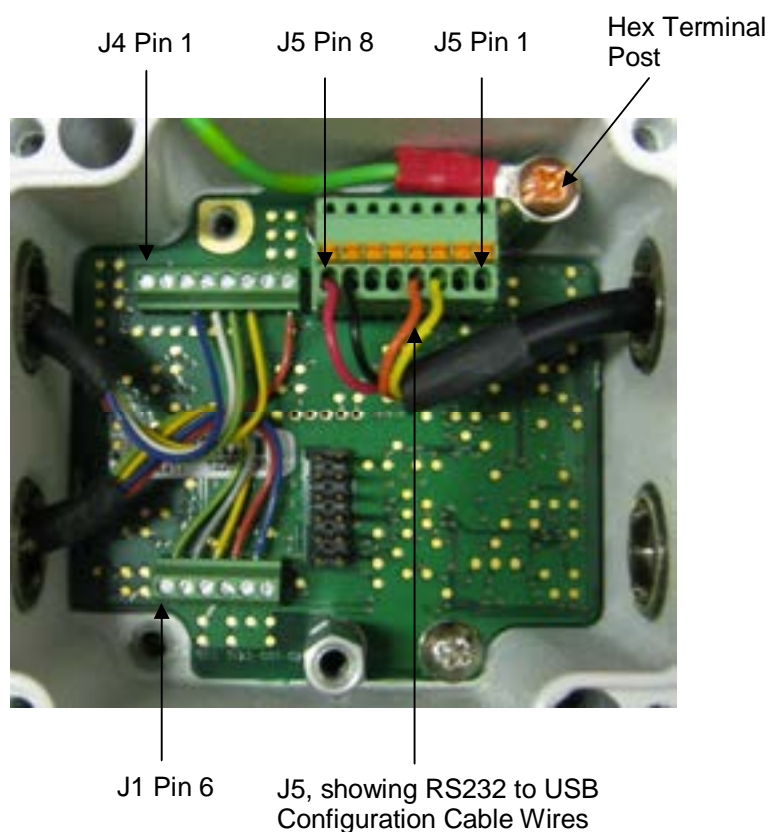
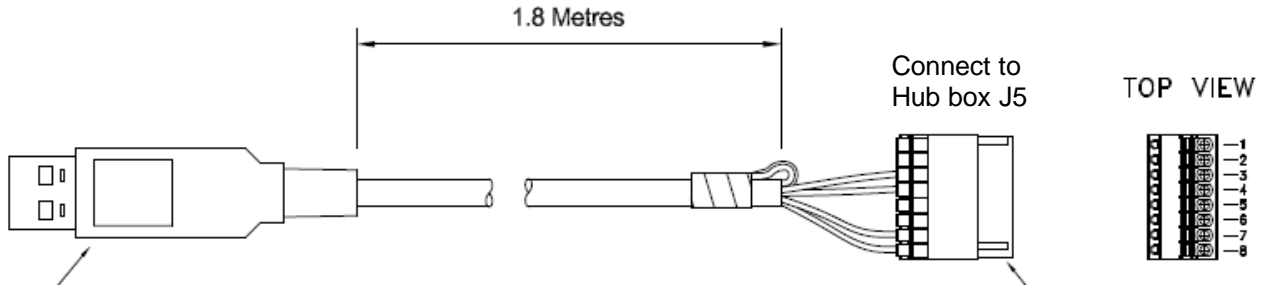


Figure 4 Internal view of the MetPak

USB Lead Connection (COMMS set for RS232)



Connecting MetPak to a PC USB port using the Gill Configuration Cable 1723-10-051.

| | | | | | | | | |
|--------|------|------|--------|--------|------|------|-------|-----|
| J5 Pin | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Colour | None | None | Yellow | Orange | None | None | Black | Red |

Figure 5 Connection of Gill USB Cable (Part No. 1723-10-051)

NOTE:- If upon connecting the USB lead to a PC the driver is not found by the PC, then the appropriate driver to match the PC Windows version may be downloaded from:-

<http://www.ftdichip.com/Drivers/VCP.htm>

Digital Output RS232 Connections (COMMS set for RS232)

This is the MetPak default communication configuration setting.

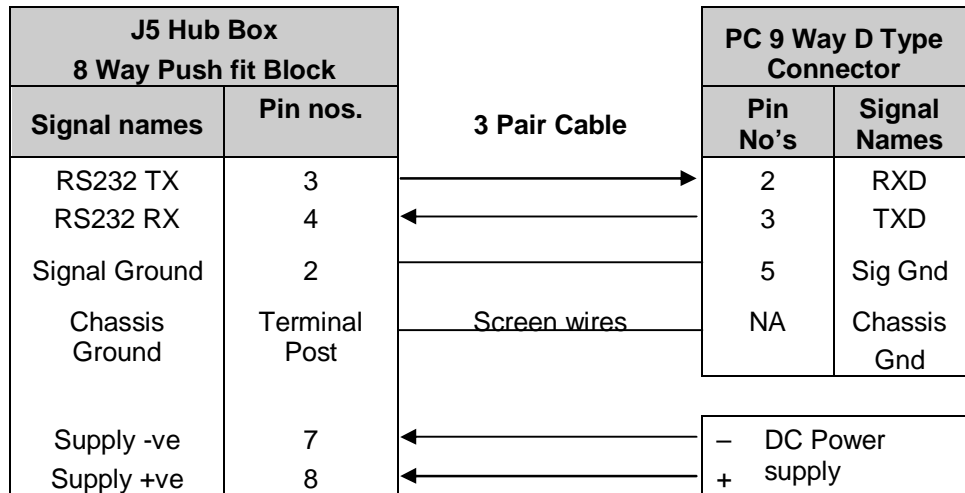


Figure 6 RS232 connections

Digital Output RS422 Connections (COMMS set for RS422)

This is not the default communications setting; ensure the MetPak has been configured for this output requirement before wiring to a user device.

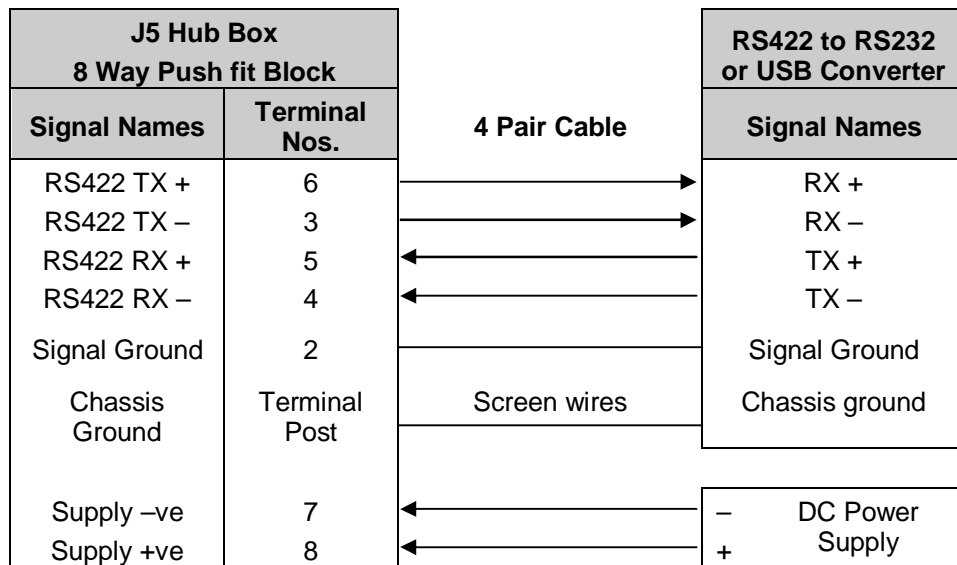


Figure 7 RS422 connections

Digital Output RS485S 2 Wire Point to Point Connections (COMMS set for RS485P2W)

This is not the default communications setting; ensure the MetPak has been configured for this output requirement before wiring to a user device.

Note that is not possible to network other devices on this 2-wire RS485 link unless the unit is set for Modbus operation and application.

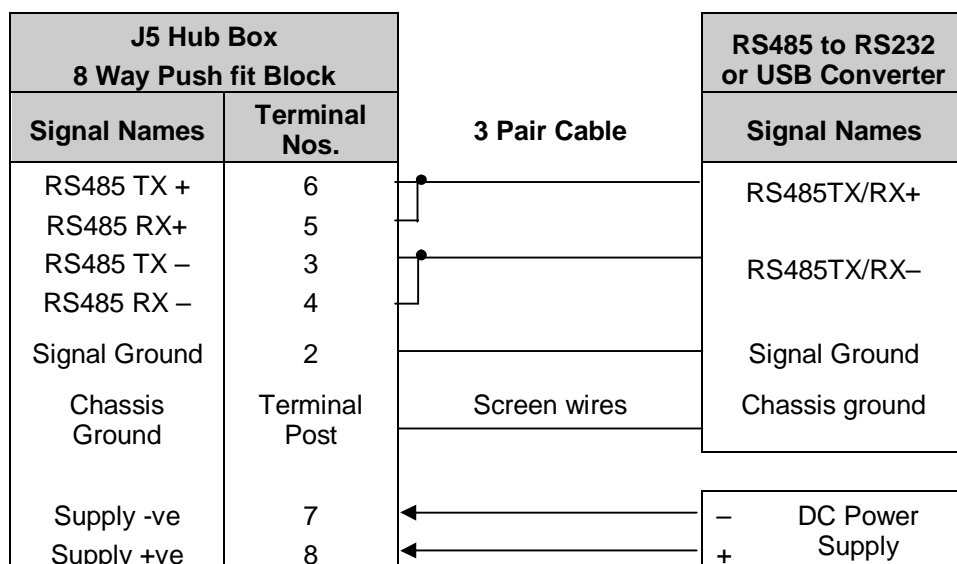


Figure 8 RS485 Connections

Digital Output SDI-12 Connections (COMMS set for SDI-12)

This is not the default communications setting; ensure the MetPak has been configured for this output requirement before wiring to a user device.

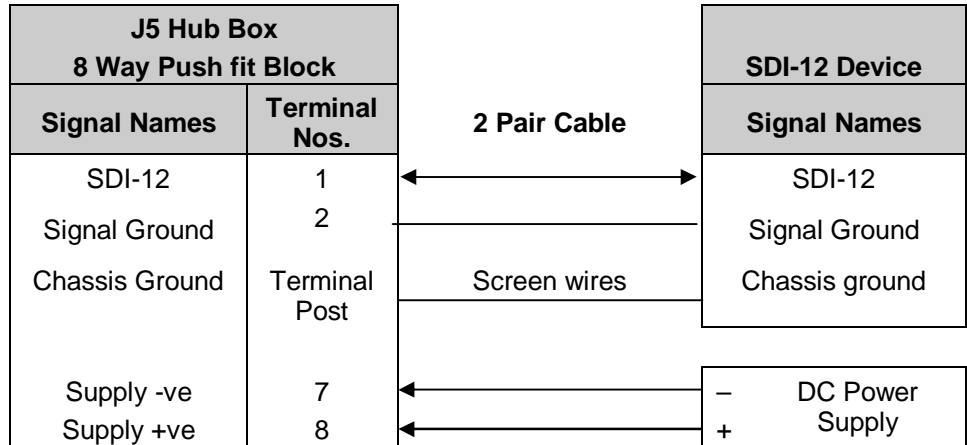


Figure 9 SDI-12 connections

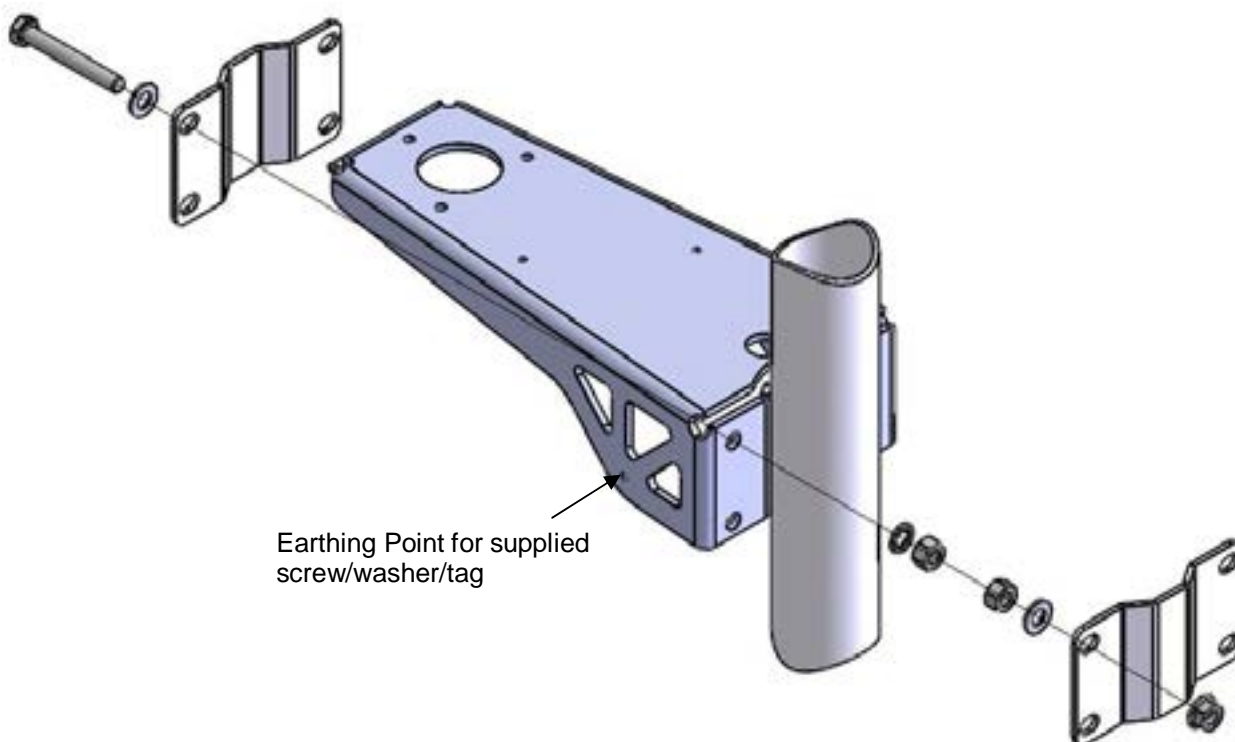
2.2.5 Mounting MetPak

MetPak uses a mounting clamp suitable for attaching to a vertical pipe with a diameter of 30-58mm. When mounting the MetPak, consider the position, orientation and alignment of the unit.

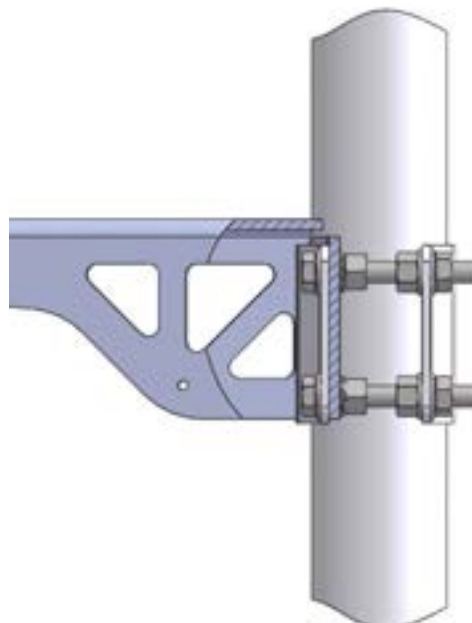
Note that the mounting pipe should first be degreased and when assembling the MetPak clamp assembly the outer clamp nuts need to be tightened evenly to a torque figure of 3 Nm.

The moving plate part of the clamp needs to be reversed for poles below 38 mm diameter.

Mounting Bracket Assembly Exploded View



Mounting Bracket Assembled View



Position

It is the responsibility of the customer to ensure that the MetPak is mounted in a position clear of any structure, including the mounting post, which may obstruct the airflow or induce turbulence.

Orientation

Normally, the MetPak is mounted on a vertical pole, ensuring a horizontal Measuring Plane, (see Figure 10).

For indoor use the unit may be mounted with the Measurement Plane set to any required orientation.

Alignment

The MetPak Wind Sensor should be aligned to point to North, or any other reference direction – for example, the bow of a boat.

There are two arrows, a coloured rectangle, and an alignment notch to aid alignment.



Note. It is usually simpler to work first with a compass at ground level and identify a suitable landmark and its bearing.

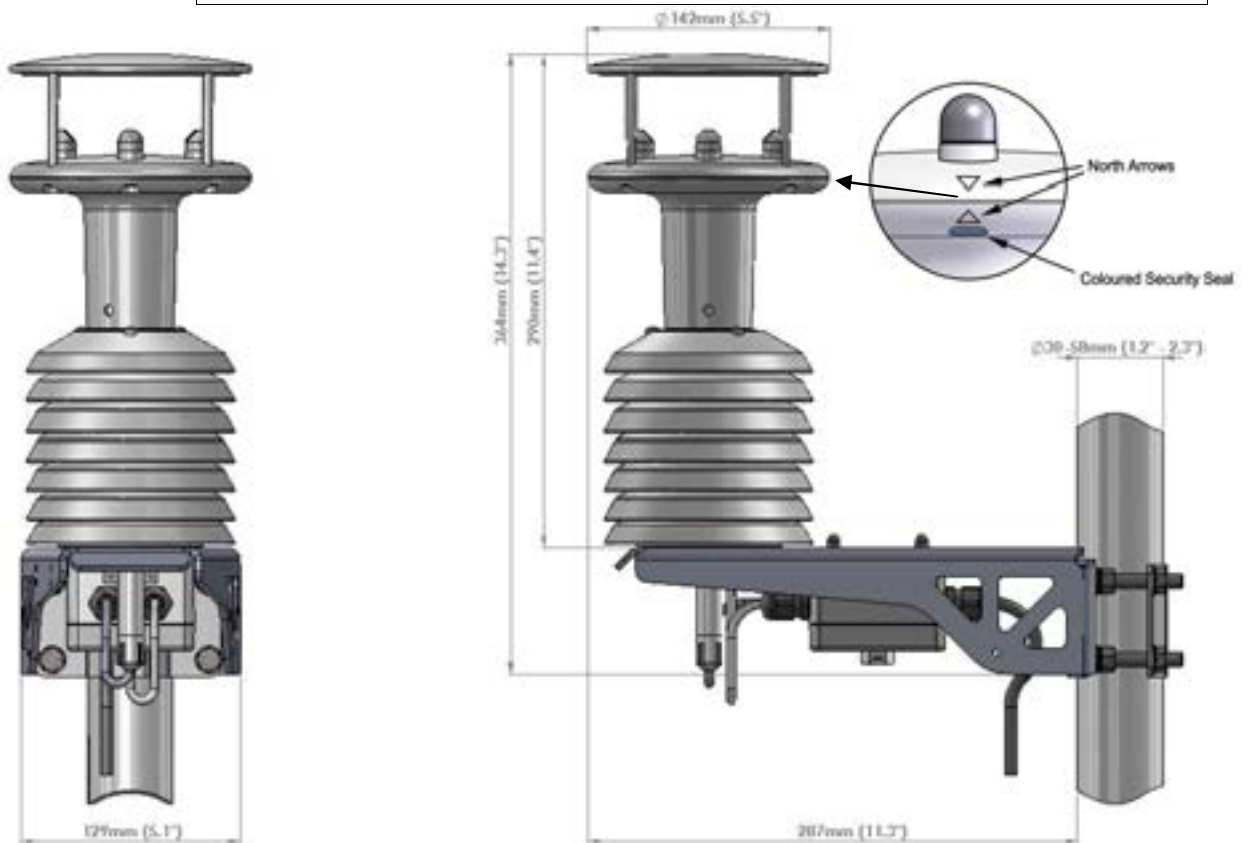


Figure 10

Correct Mounting Position for MetPak

Interference

Always check the installation to ensure the MetPak is not affected by other equipment operating locally, which may not conform to current standards, e.g. radio/radar transmitters, boat engines, generators etc.

See Para 2.1 for guideline details.



CAUTION. Do NOT mount the MetPak in close proximity to high-powered radar or radio transmitters. A site survey may be required if there is any doubt about the strength of external electrical noise.

3. Operation

This section provides an overview of the installation and operation of MetPak. For more detailed information about any of the steps, use the references to other sections of this manual.

3.1 Start Guide

Decide how you are going to connect MetPak to your PC or communications network. MetPak supports the following options:

- USB connection using Gill's RS232 to USB 1.8M configuration cable (includes integral 5V power supply). To order, contact your dealer quoting part number: 1723-10-051).

NOTE. You could use an equivalent RS232-USB adapter such as EasySynch RS232 to USB adaptor.

- RS232 connection using standard cable and PC COM port. Separate 5V to 30V dc power supply also required.
- RS422 using RS232 converter.
- RS485 2 wire point-to-point communication using suitable converter (note RS485 2 wire point-to-point is not compatible with MetView Software).
- SDI-12 connection (note SDI-12 is not compatible with MetView Software).

NOTE. MetPak is pre-configured for RS232 communication (factory setting). If you want to use an alternative communication protocol, you will need to set up the unit using an RS232 connection (with an appropriately wired cable), change the setting), shut the unit down, attach a cable for the new communication type, and then restart the unit.

1. Unpack MetPak. Check that you have the following:
 - MetPak unit (Part No. 1723-1B-2-111).
 - Gill MetView, MetSet Software and Manual supplied on the CD.If any parts are missing, please contact your dealer.
2. Open the hub box by unfastening the four retaining screws. Locate the connector: J5 (see Figure 4). Carefully pull the connector block from its pins.
3. Prepare the communications cable by stripping the wires to a length of 8mm. Feed the prepared cable through one of the two available ports on the side of the hub box.
4. Connect the cable to J5 as described on page 9 for your chosen communications method.
5. Carefully press J5 onto its circuit board pins.
6. Replace the top on the connection box. Tighten the gland on the connection port to seal the cable in place.

7. If you are carrying out a bench test, continue to step 13. When you have finished testing, return to Step 10.
8. Ensure that if using a mounting pole that it has been degreased in the area where the MetPak will be positioned.
9. Position the MetPak against the mounting post (see page 13), fit the mounting kit bracket and tighten sufficiently to hold the unit in place but allowing it to be rotated or moved up and down the pole.
10. Check the orientation and alignment of the unit (see page 13).
11. Check the height of the unit and ensure it is clear of any obstructions, including the mounting post, that could interfere with MetPak's measurements (see page 13).
12. Tighten the mounting bracket nuts evenly to a torque of 3Nm to hold the unit firmly in place.
13. Connect the communications cable to your PC or network device.
14. Place the MetPak CD in your PC's CD drive and install MetView.

3.2 MetView

MetView Software allows you to view the MetPak data graphically and has a simple data logging facility.

Before you can use MetView, check that MetPak is correctly connected to a COM or USB port on your PC (see Para 2.2.4).

NOTES: MetView is compatible with RS232 and RS422 connected units only.
MetView will not read NMEA, SDI-12 or MODBUS data strings.

3.2.1 Opening MetView

Click on the MetView button on your PC's desktop or choose:

Start > Programs > MetView > MetView

The MetView Control Centre window is displayed

Scan Button– If MetPak transmit and receive wires are connected to the PC then use the Scan button to connect to MetView.

Connection is Receive Only Tick Box – Use if the MetPak connection to the PC has only transmit wires connected and a MetSet version of its current device settings is available to upload to MetView. Select 'Connection is Receive only' tick box and click on the Scan button. Upload a MetSet generated Device file from a PC location as directed.



Figure 11 Opening MetView Screen

3.2.2 Scanning for Devices

To set up communicate between MetView and a connected MetPak:

1. Click on the **Scan** button to search the available COM ports for MetPak devices.



Figure 12 Scanning for MetPak Devices

When a device is found, MetView obtains the MetPak configuration settings and then retrieves and displays MetPak data.

3.2.3 The MetView Console

When connected correctly, MetView displays its data-monitoring console. This consists of five gauges showing: Temperature, Humidity, Pressure, Wind Speed and Wind Direction. There is also a digital readout of Dew Point. Buttons beneath each of the gauges allow you to choose the displayed units and other options. Each gauge also shows the maximum and minimum values recorded during the current session. The wind speed gauge also shows the maximum gust speed.

Note: MetView will not show data if the unit is set for NMEA, MODBUS or SDI-12 formats.

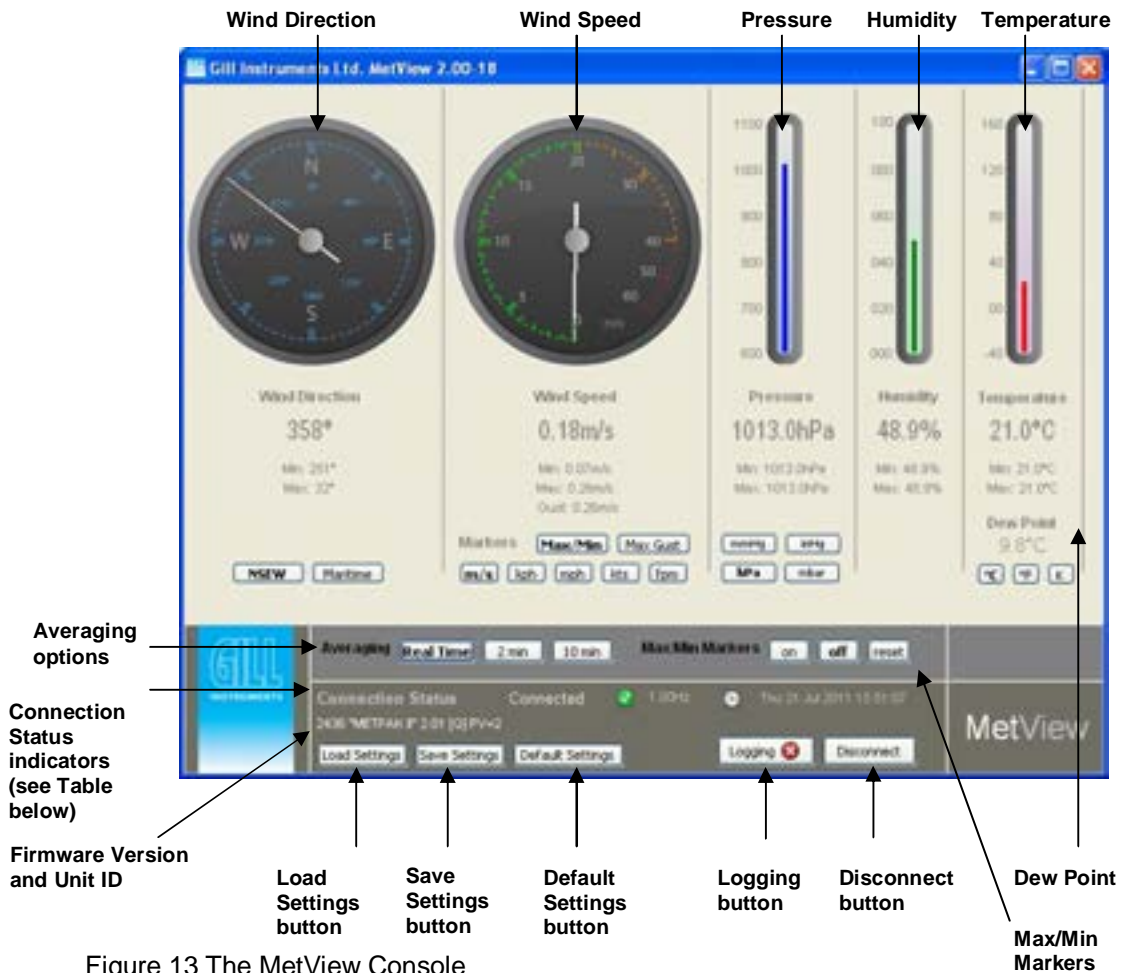


Figure 13 The MetView Console

Connection Status

Table 4 Connection status indicators

| Reading | Function |
|--------------------------|--|
| Green Background Tick | Indicates MetPak logging or communicating correctly with MetView along with reading the MetPak firmware version. |
| Red Background Cross | Indicates MetPak not logging or not connected/communicating to MetView. |
| 1.00Hz | Indicates the output rate of the MetPak when connected. Reads when the unit is communicating correctly with MetView. |
| Thu 21 Jul 2011 15:51:07 | Real Time PC date and time indication. |

3.2.4 MetView Console Display Options

MetView Console buttons can convert data from the MetPak to read different units or scale settings. This does not alter the actual MetPak configuration.

Units shown in **bold** denote default settings

Table 5 MetView scale and unit options

| Gauge | Function |
|-------------------------|---|
| Wind Direction | Use buttons to choose from two display styles: NSEW or Maritime |
| Wind Speed Markers | Use buttons to add markers on the gauge for Max/Min or Max Gust. |
| Wind Speed | Use buttons to choose from five wind speed units: m/s , kph, mph, kts, fpm |
| Pressure | Use buttons to choose from pressure scales: hPa , mbar, inHg, mmHg |
| Humidity | Displays Max and Min values during current session in % |
| Temperature & Dew Point | Use buttons to choose from three temperature scales: °C , °F, K |

Table 6 MetView averaging options

| Setting | Function |
|------------------|---|
| Real Time | Choose this button for no averaging |
| 2 Min | Select for 2 minute rolling average of all sensor readings |
| 10Min | Select for 10 minute rolling average of all sensor readings |

Table 7 Max/min markers

| Setting | Function |
|------------|---|
| Off | Maximum and Minimum Markers on all gauges turned off |
| On | Maximum and Minimum Markers on all gauges turned on |
| Reset | Reset all Gauge Maximum/Minimum Markers and all digital Maximum/Minimum reading at will |

Table 8 MetView Screen Settings Options

| Setting | Function |
|------------------|--|
| Save Settings | Will Save all the current MetView screen settings to a file for later retrieval if required. |
| Load Settings | Will load and update the MetView screen with a previously saved setting. |
| Default Settings | Will return all MetView screen settings to factory default. |

3.2.5 MetView Gauge Ranges and Graphs

Gauge Range Settings.

MetView Pressure, Humidity and Temperature Gauge ranges may be changed to view changes in conditions more visibly.

Note, These changes only affect MetView settings and do not affect the MetPak output.

For instance if the typical temperature measurement range required is from +10 degrees to +40 deg C then the temperature gauge range can be adjusted to reflect this.

Place the mouse pointer over the Temperature display gauge and double click to bring up the Set Gauge Range screen. Change Max and Min readings to required values, e.g. +10 min and +40 max.

Click on Set.

The Temperature gauge range will be updated to reflect the change.

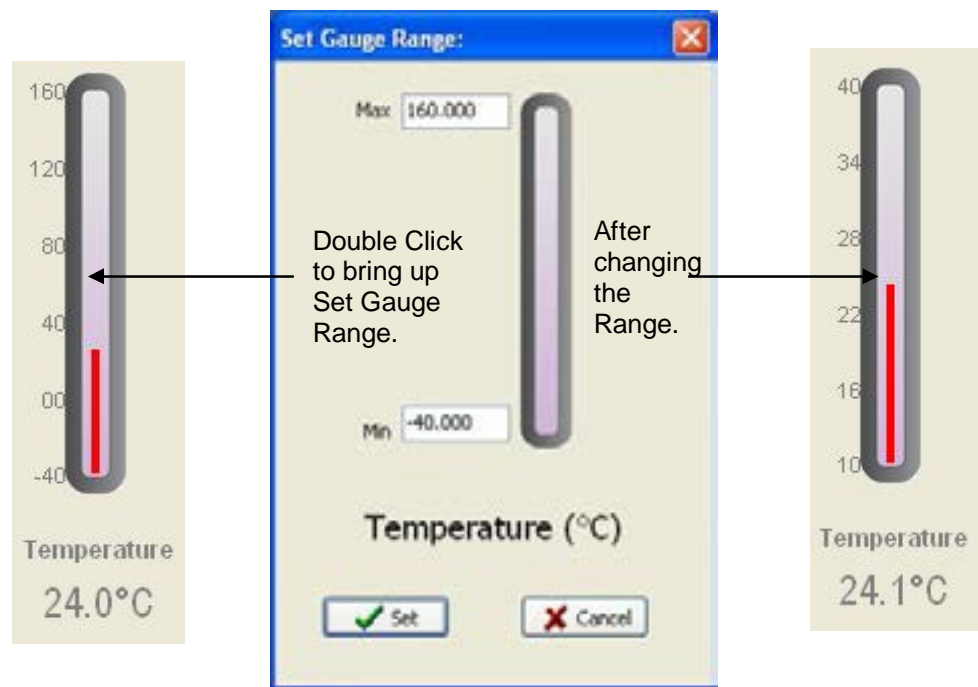


Figure 14 MetView Gauge Range

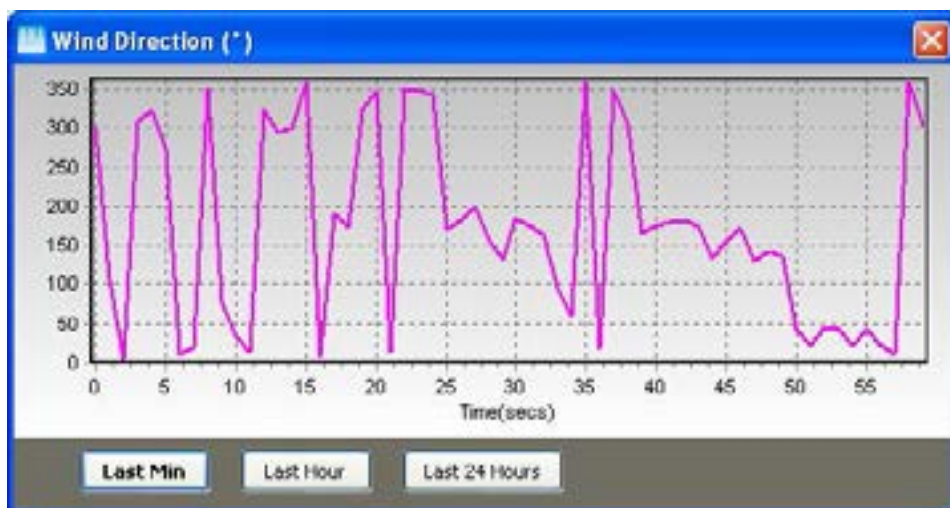
Graphs

MetView allows data detected over the last minute, last 1 hour and last 24 hours to be accessed and shown on a graph.

Note. Data is only shown up to the time when the graph function is selected, the graph is not updated once opened. Data is collected from the time that MetView is opened and reading data from a MetPak.



Double Click on the reading to bring up the graph.



Click on the Last Min, Last Hour or Last 24 Hours buttons as required to view data.

Figure 15 MetView Graph

3.2.6 Data logging



NOTE. MetView logs data based on the MetPak configuration not on the MetView console settings.

To log MetPak data, click on the **Logging** button on the MetView console. The *Logging* dialog box is displayed.



Figure 16 Setting up data logging

Setting up a logging file

1. Select **Enable Logging** to start logging to a file.
2. Identify the name and location for the logging file:

| | |
|--------------------------|---|
| Log File location | Click on the Browse button to identify the folder where you want to store the data file. Enter the name of the file. |
| Log file header | If required type some notes on the data that is to be recorded which will appear at the top of the saved data log file. |
3. Choose from the following additional options:

| | |
|--------------------------|--|
| Log File Rotation | Set up segmented logging with each logged file length determined by the number entered in the text box below. The figure 3600, for example, means that each log file length will be 3600 lines of data. Maximum entries per log file is limited to 65535 and a maximum of 2048 log files can be created. |
| Add Timestamp | Adds the date and time to the logged data file taken from the PC clock. |

To start logging

1. Check that the **Enable Logging** option is selected.
2. Click on the **OK** button to commence logging and return to the console.



Note. To show that data is being recorded, the Logging button's icon changes to a green tick:



To stop logging

To turn off logging:

1. Click on the **Logging** button on the MetView console. Clear the **Enable Logging** check box.
2. Click on the **OK** button. If logging has stopped, the Logging button shows a red background cross instead of the green background tick (see above).

Understanding logged data

Logged data is stored to a file with a **.log** extension. This can be viewed in any text/HTML editor or spreadsheet application.

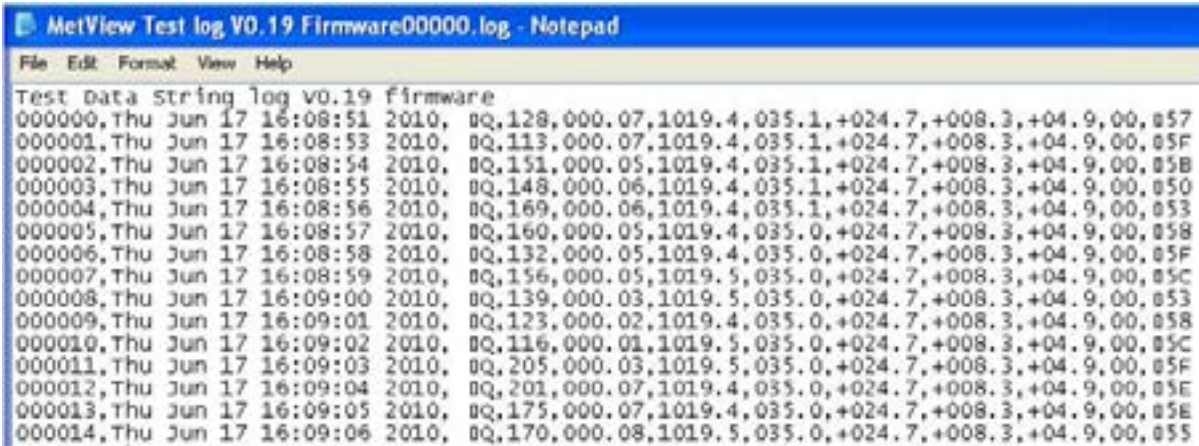
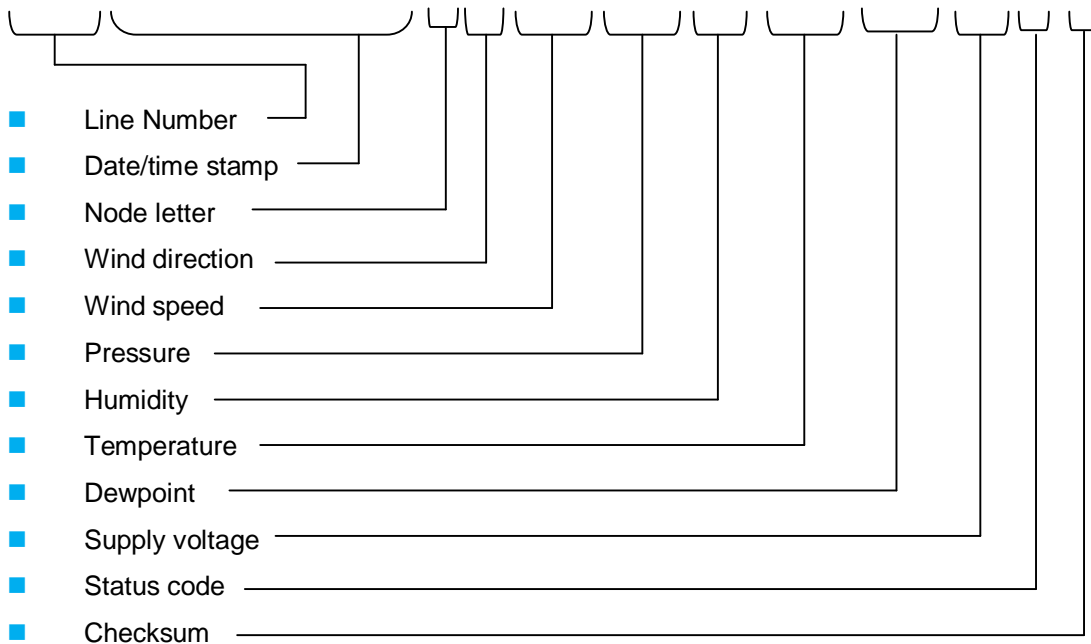


Figure 17 A typical data log (viewed in Windows Notepad)

Each entry in the default file format consists of the following:

000001 Thu Jun 17 16:08:53 2010, BQ, 113,000.07, 1019.4, 035.1, +024.7, +008.3, +04.9, 00, 85F



3.3 Configuring MetPak

MetPak can be configured using:

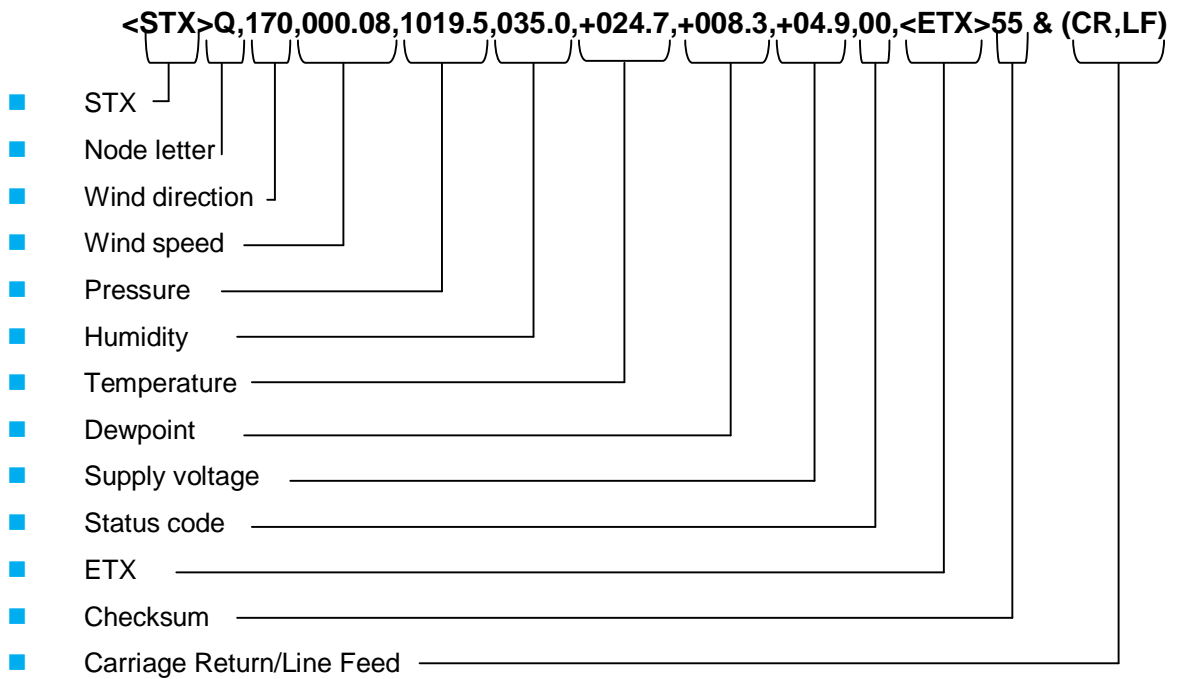
- Gill MetSet or a terminal program such as Windows HyperTerminal.
- Gill Wind software used as a Terminal Program only.

The default configuration settings are listed in the following table.

Table 9 Default configuration settings

| Setting | Function |
|-----------------------|--|
| Comms Levels | RS232 |
| Baud Rate | 19200 |
| Data Connection | Data Bits 8, Parity None, Stop Bits 1, Flow Control None. |
| Node ID | Q |
| Output rate | 1Hz |
| Message Mode | Continuous |
| ASCII Set Up | Carriage return and line feed, Echo on |
| North Alignment | 0 |
| Sensor WindSpeed | On |
| Wind Speed Units | MS (Metres/Second) |
| Temperature Sensor | On |
| Temperature Units | C (Degrees Celsius) |
| Dewpoint Sensor | On |
| Dewpoint Units | C (Degrees Celsius) |
| Pressure Sensor | On |
| Pressure Units | Hecto Pascals |
| Humidity Sensor | On |
| Humidity Units | % |
| Report Format | Node, Polar (Wind Direction and Wind Speed), Pressure, Humidity, Temperature, Dewpoint, Volts, Status, Checksum. |
| Status Message Output | On |
| Report Message Output | On |
| Units Message Output | On |
| Inputs Message Output | On |
| Output Sentence | Comma Separated Variable |

Example Default ASCII Data String:



NOTES:

<STX> is the Start of String character (ASCII value 2).

<ETX> is the End of String character (ASCII value 3).

Checksum, the 2 digit Hex Checksum sum figure is calculated from the Exclusive OR of the bytes between (and not including) the STX and ETX characters.



NOTE. Switch on Time.

Upon switching on the MetPak, allow 9.5 seconds to elapse before data is output.

3.3.1 Configuring MetPak using MetSet

Before you use MetSet check that MetPak is correctly connected to a COM or USB port on your PC.

NOTE: MetSet is compatible with RS232 and RS422 connected units only.

Click on the MetSet button on your PC's desktop or choose:

Start > All Programs > MetSet > MetSet

The MetSet Control Centre window is displayed. If you have more than one MetPak connected to your PC, MetSet, by default, selects the first device detected.

For most applications it is recommended to click on the MetSet **Connect and Read** button.

MetSet interrogates the MetPak and returns a summary of the device settings.

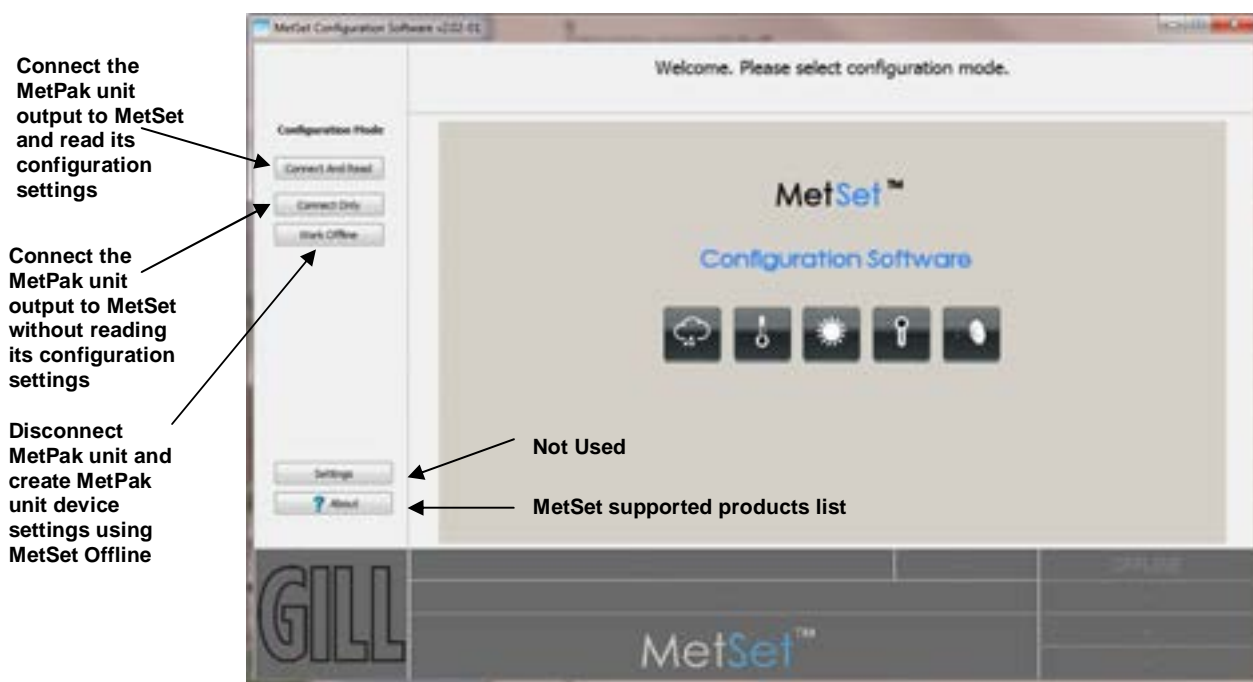


Figure 18 Opening MetSet Screen

Summary of Device Settings Screen

MetSet interrogates the MetPak and returns a summary of the device settings.

Note that MetSet also saves a copy of this screen to the connected PC as a Session Report File that can be accessed from the following destination.

C:\Program Files(X86)\Gill Instruments\MetSet\SessionReports.

Close Summary of Device Settings screen to go to the Editing screens.

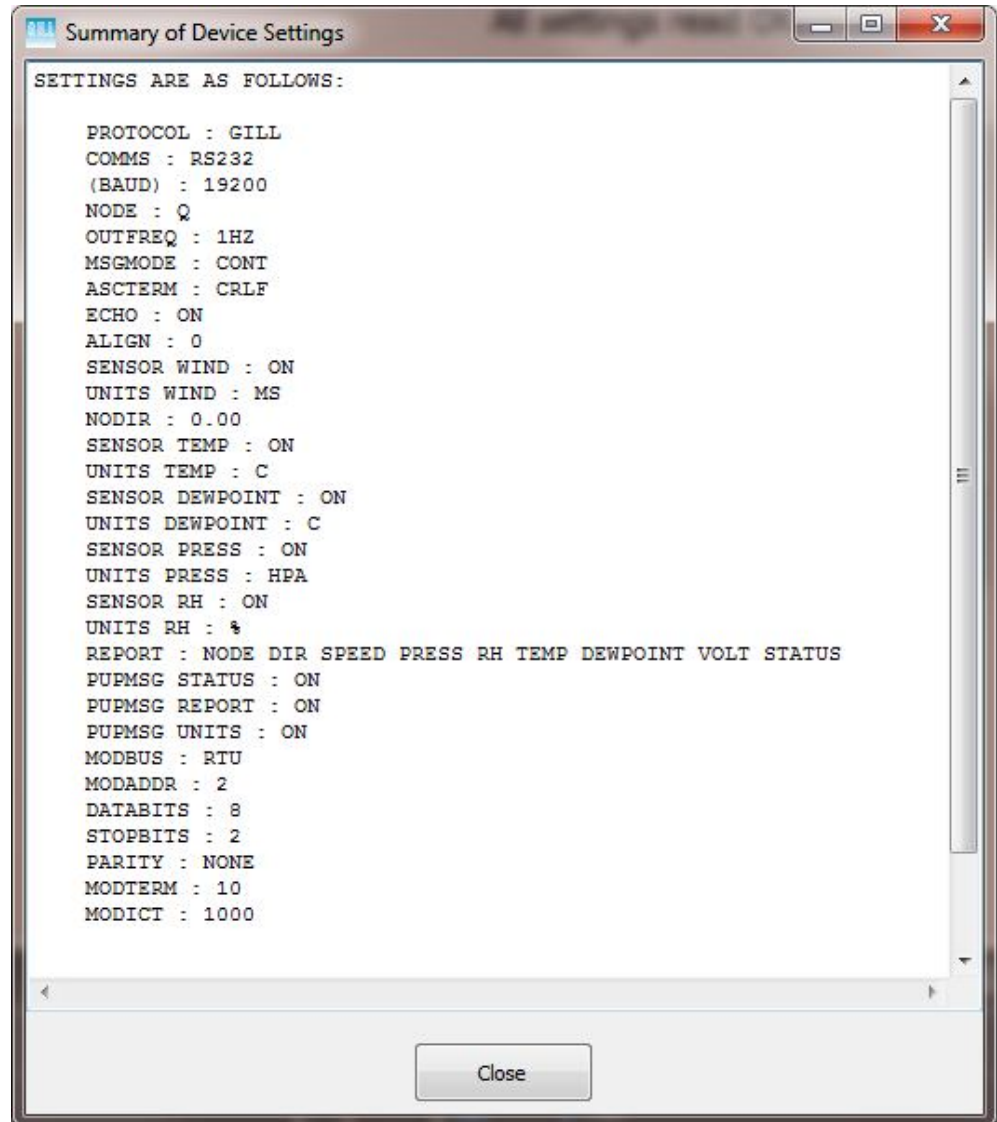
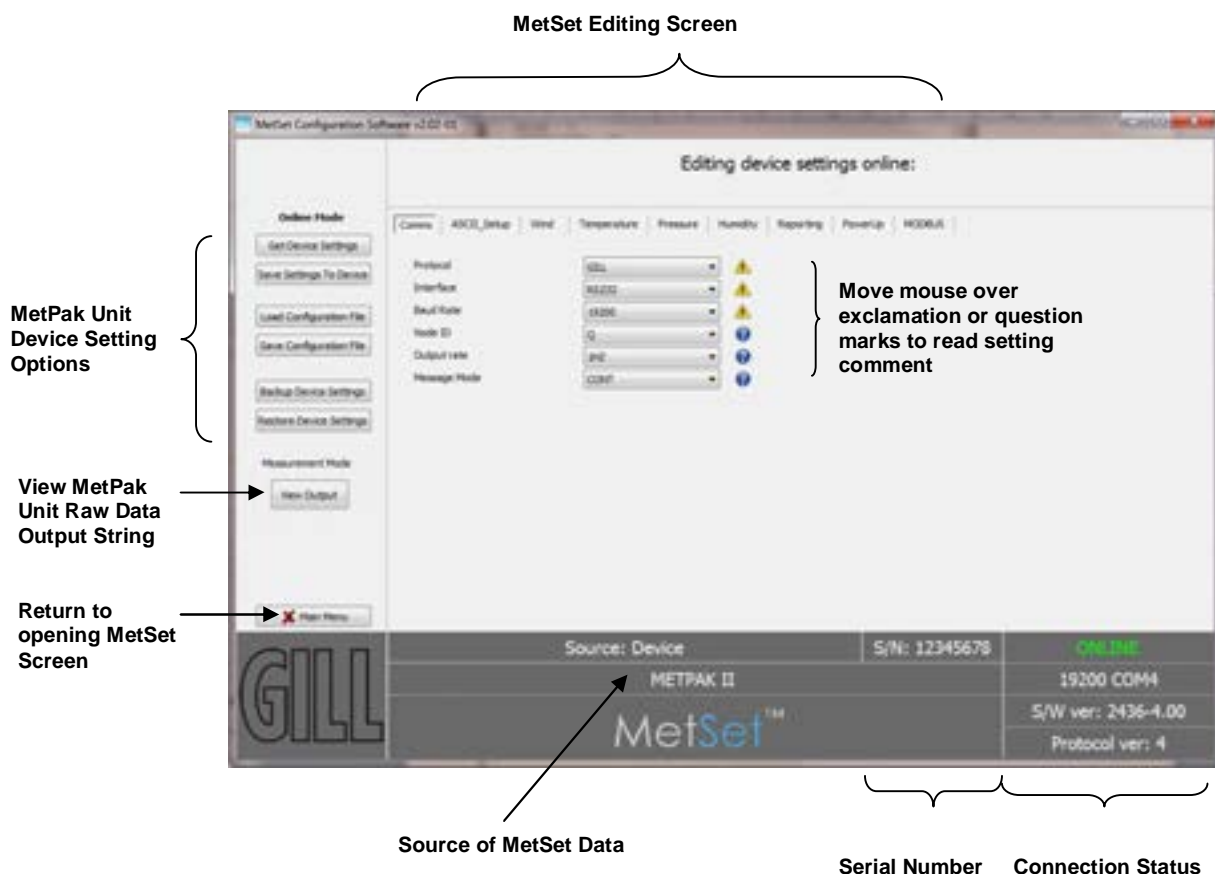


Figure 19 Summary of MetPak Device Settings using MetSet

3.3.2 MetSet Editing Screen

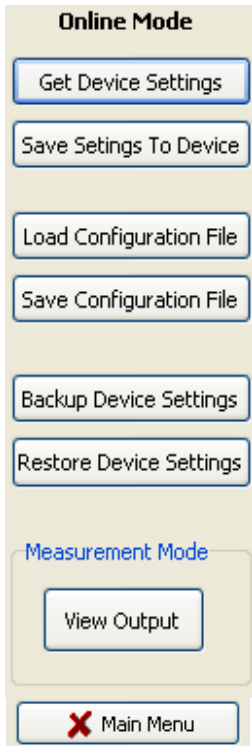
When connected correctly a MetSet editing screen is available to read configuration settings, change configuration settings, save MetPak configuration settings to a PC file location, upload MetPak configuration settings from a PC file and view the MetPak raw data string output.



MetSet Connection Status Information.

| Reading | Function |
|-------------------|--|
| S/N:12345678 | MetPak serial number. |
| ONLINE | ONLINE in green indicates the MetPak has been successfully connected to MetSet. OFFLINE in Grey indicates that MetSet is being used without a MetPak in communication with MetSet. |
| 19200 COM 4 | 19200 is a report on the MetPak Baud rate setting. COM 4 is a report on the MetPak COM Port connection number. |
| S/W ver 2436-4.00 | 2436 is the MetPak Firmware number 4.00 is the firmware revision. Protocol Version 4 (Gill internal reference). |
| Source:Device | MetSet reads 'Device' when the source of the data that MetSet has retrieved has come from the MetPak. MetSet reads 'File' when the source of data has come from a saved file. MetSet reports on the connected MetPak device (METPAK) and reads the unit Serial Number (S/N: 12345678). |

MetSet Online Mode Settings.



| Online Mode Buttons | Function |
|------------------------------|--|
| Get Device Settings | MetSet retrieves the MetPak Unit Configuration settings. |
| Save Settings to Device | MetSet configuration settings are saved to a connected MetPak Unit. |
| Save Configuration File | When selected MetSet edit settings are saved to a PC file location. |
| Load Configuration File | When selected MetSet retrieves a MetSet edit PC file and updates MetSet with these settings. |
| Back Up Device Settings | When selected the MetPak Unit configuration settings are transferred to MetSet and then to a file location selected on a PC. |
| Restore Device Settings | When selected MetSet retrieves a MetPak Unit configuration setting from a PC file, loads it into the MetPak Unit and updates the MetSet edit settings. |
| Measurement Mode View Output | Click on View Output to view the raw ASCII MetPak Unit data string scrolling at the output rate. (View only feature). E.g. \uparrow Q,014,000.06,1011.2,042.1,+023.0,+009.4,+12.0,00, \downarrow 40 |
| X Main Menu | Click here to go back to the opening MetSet screen |

MetSet Editing Screens.



Click on any page to select set up parameters.

The **Comms Page** can be used to Select:-

Protocol: **GILL** or MODBUS (for NMEA see the Reporting page, for SDI-12 see COMMS Interface).

Interface:- **RS232**, RS422, RS485 (point to point) and SDI-12.

Baud Rate:- 4800, 9600, **19200**, 38400 or 57600 (1200 auto selected with SDI-12 setting).

Node ID:- A to P, **Q** to Z.

Output Rate:- 0.25Hz to **1Hz**.

Message Mode:-**Continuous** or Polled.

NOTE: When COMMS or Baud Rate settings are changed and Saved to Device a warning is issued by MetSet. These setting changes will not become active until the MetPak power is turned off and turned on again. The connecting device will then also need its Comms and Baud rate settings changed to match the MetPak.

The **ASCII Set Up Page** can be used to select:-

Termination:- **CRLF** or CR

Echo:- **ON** or OFF.

The **Wind Page** can be used to select:-

North Alignment from **0**-359 degrees.

Sensor WindSpeed **ON** or OFF.

Wind Speed Units **MS**, KTS, MPH, KPH, FPM.

(Metres/Second, Knots (Nautical miles/hour), Miles/Hour, Kilometres/Hour, Feet/Minute).

No-Direction Wind Speed **0.00** (Minimum at which Direction readings are updated).

The **Temperature Page** can be used to select:-

Temperature Sensor **ON** or OFF

Temperature Units **C**, K or F (Centigrade, Kelvin, Fahrenheit)

Dew Point Sensor **ON** or OFF

Dew Point Units **C**, K or F

The **Pressure Page** can be used to select:-

Pressure Sensor **ON** or OFF

Pressure Units **HPA**, MB, MMHG, INHG

(Hecto Pascals, Milli-Bars, Millimetres Mercury, Inches Mercury).

The **Humidity Page** can be used to select:-

Humidity Sensor **ON** or OFF

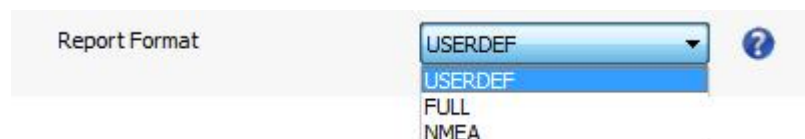
Humidity Units %

The Reporting Page can be used to select:-

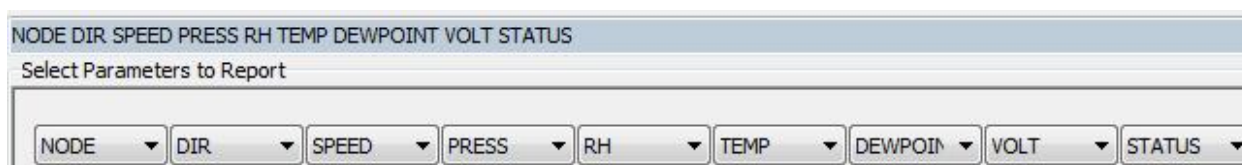
Report Format **FULL**, all sensors are selected to be output.

Report Format **USERDEF**, Allows sensors to be selected and change the order of their output in the data string.

Report Format **NMEA** (see Para 3.3.4).



Parameters to report are as follows:-

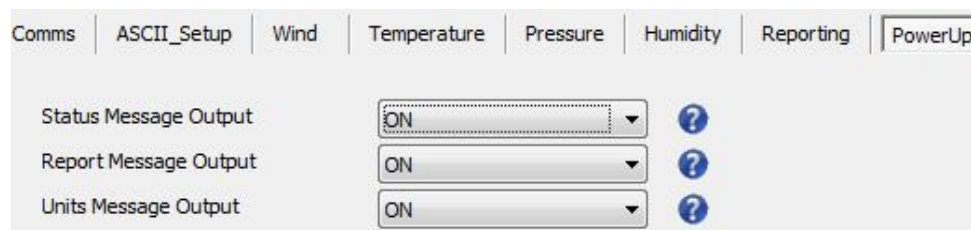


Select Parameters to Report using the drop down menus

NODE,DIR,SPEED,PRESS,RH,TEMP,DEWPOINT,VOLT,STATUS.

Report parameters can be selected in any order or on or off in USERDEF.

The Power Up Page can be used to select:-



Status Message Output **ON** or OFF.

(E.g. METPAK 2436 V4.00, STARTUP: OK)

Report Message Output **ON** or OFF.

(e.g. NODE,DIR,SPEED,PRESS,RH,TEMP,DEWPOINT,VOLT,STATUS,CHECK)

Units Message Output **ON** or OFF

(e.g. -,DEG,MS,HPA,%,C,C,MM,V,-, = CONFIGURED)

The MODBUS Page can be used to select:-

| Comms | ASCII_Setup | Wind | Temperature | Pressure | Humidity | Reporting | PowerUp | MODBUS |
|-----------------------------|-------------|------|-------------|----------|----------|-----------|---------|--------|
| Mode | RTU | | ? | | | | | |
| Address | 2 | | ? | | | | | |
| Data bits | 8 | | ? | | | | | |
| Stop bits | 2 | | ? | | | | | |
| Parity | NONE | | ? | | | | | |
| Termination Char ASCII code | 10 | | ? | | | | | |
| Inter-char timeout (ms) | 1000 | | ? | | | | | |

Mode **RTU** or ASCII.

Address 1 to 247, default is **2** .

Data Bits 7 for Modbus ASCII and **8** for Modbus RTU.

Stop Bits 1 for Even/Odd Parity or **2** for No Parity.

Parity **NONE**, ODD, or EVEN.

Termination Char ASCII code 0-255, default is **10**.

Inter Char Timeout (ms) 500 to 10000, default is **1000**

3.3.3 Configuring MetPak using HyperTerminal



NOTE. . This section describes the procedure using Windows HyperTerminal. Alternatively Gill Wind Software (<http://www.gill.co.uk/main/software.html>) can be used a Terminal Emulator (note Tools feature not applicable). Select the required COM port and click on OK, the required 19200 Baud Rate is already selected (or use the Baudrate drop down) then continue as from step 7.

Setting Up HyperTerminal

To configure MetPak using HyperTerminal:

1. Select an available Com port and connect the MetPak unit.
2. Run **Hypertrm.exe**
(Typically accessed via Start | All Programs | Accessories | Communications | Hyperterminal).
3. Select **New Connection** from the **File** menu.
4. Enter a name for the connection, for example *MetPak* and, optionally, select an icon to represent it. Click on the **OK** button.
5. In the *Connect To* dialog box, change *Connect Using* to *COMX* (where *X* is the number of the selected COM port). Click on the **OK** button.
6. In the *COMX Properties* dialog box, adjust the *Port settings* to match the MetPak unit's settings. The default settings are :

| | | |
|---|-----------------|-------|
| ■ | Bits per second | 19200 |
| ■ | Data bits | 8 |
| ■ | Parity | None |
| ■ | Stop bits | 1 |
| ■ | Flow Control | None |
7. Click on the **OK** button.

Message Reporting

MetPak has two reporting modes:

- Continuous mode

In continuous mode (the default) MetPak reports continuously. So, if you have set up the connection correctly, you should now see data strings scrolling across the HyperTerminal window. For example:

```
Q,113,000.07,1019.4,035.1,+024.7,+008.3,+04.9,00,♥5F
```

- Polled mode

If the unit has been set to polled mode (see MSGMODE command in Table 10), type ?Q (where Q is the unit node letter) to prompt one line of the data string. Note, allow 9.5 seconds after switching on the unit before sending a poll command.

When polled, allow 570 milli-seconds for the unit to respond with a line of data. If the MetPak detects a pressure/temperature/humidity sensor fault then allow 4 seconds for an error data output.

Entering MetPak setup mode

To enter the unit's setup mode:

- If the unit is in continuous reporting mode, type *.
- If the unit is in polled mode, type *Q (where Q is the unit node letter).

The MetPak unit stops reporting sensor measurements and reporting (if in continuous mode) and responds with the following message:

SETUP MODE

The unit is now ready to receive configuration commands.

Returning to measurement mode

Type **Q** and press **Enter**. (exit from SETUP mode and return to measurement mode). The MetPak unit returns to measurement mode and begins reporting data (if set up for continuous mode).

Polling for Data

The MetPak unit must be set for Message Mode Poll using MetSet software (Comms Page).

A line of data will be output upon receipt of a ? followed by the Node ID (default Q).

It is recommended not to use letters A to F as these characters can appear in the checksum in the data string.

Notes:-

In Polled mode the unit **MUST** be allowed 9.5 seconds after switch on to be operational before the ? and Node letter are used to enable polling or it will be missed.

When in polled mode, when data is requested allow 570 milli-seconds for the unit to respond with a line of data.

If the MetPak detects a pressure/temperature/humidity sensor fault then allow 4 seconds for an error data output.

Polled mode can only be used for point to point communications; it is not possible to network units on to a common bus (except in SDI-12 mode and MODBUS modes).

Configuring commands for MetPak

Table 10 MetPak configuration commands

NOTE: After typing the Command and Parameter press Enter key to execute (except * command).

| Command | Parameters | Description and examples |
|---------|------------|---|
| * | * | Used to place the unit into a SETUP mode so that User Commands may be sent to change unit settings. |
| *A-Z | *A Z | If the unit is in Polled mode this command is used to place the unit into a SETUP mode so that User Commands may be sent to change unit settings. Where Q is the default node letter but may be set between A to Z. It is however recommended not to use letters A to F as these characters can appear in the checksum in the data string. |
| ?A-?Z | ?A to ?Z | ?A - ?Z Retrieves a line of data from a MetPak set for Polled mode with a Node identifier set to A to Z. Note. The unit MUST be allowed 9.5 seconds from switch on to be operational before the ? is used to enable polling, or it will be missed. When polled, allow 570mS for the unit to respond with a line of data. If the MetPak Unit detects a pressure/temperature/humidity sensor fault then allow 4 seconds for an error data output. |

| Command | Parameters | Description and examples |
|-----------------|---|---|
| ALIGN | 0 359 | Align, sets and reports the degree offset applied to wind direction data read from the MetPak. ALIGN <no parameter> returns the current value ALIGN 0 Sets North Alignment to 0°. |
| ASCTERM | CR CRLF | Sets ASCII output string terminator. ASCTERM <no parameter> returns the current value ASCTERM CR - ASCII output string terminator is <CR>. ASCTERM CRLF terminator set to <CR><LF>. |
| BAUD | 4800 9600 19200 38400 57600 | Sets the serial interface baud rate. Selection must be confirmed with a letter B. Parity selection and duplex operation is optional BAUD <no parameter> returns the current value Example: to change 19200 baud to 4800 Baud: Type BAUD 4800 and press Enter. Change the terminal baud rate to 4800. Type B and press Enter. Completes the 4800-baud selection. |
| COMMS | RS232 RS422 RS485P2W SDI12 | Sets the serial interface communication protocol. COMMS <no parameter> returns the current value. To change to RS422 operation: Type COMMS RS422 and press Enter. (the Comms setting will remain unchanged allowing further settings to be changed and data viewed until the system is powered down and restarted). NOTE: The hardware connections will need to be changed to match the new Comms setting. |
| DATABITS | 7 or 8 | Sets the MODBUS DATA String BITS to 7 or 8. DATABITS<no parameter> returns the current value. DATABITS 8 – Sets the data bits to 8 See also the MODBUS entry |
| ECHO | OFF ON | Character echo can be enabled or disabled. If enabled, received characters are only echoed while in interactive mode. ECHO <no parameter> returns the current value. |
| EXIT | | Used to change the unit from SETUP mode to Measurement mode (alternatively type Q or QUIT) |
| HELP | | Lists commands that are currently available. |
| MODADDR | 1 2 to 247 | Sets the MetPak MODBUS address number. MODADDR <no parameter> returns the current value (1 to 247). MODADDR 1 sets MetPak MODBUS address to 1. |
| MODBUS | RTU or ASCII | Sets the MetPak to MODBUS RTU or MODBUS ASCII. MODBUS <no parameter> returns the Setting (RTU or ASCII). MODBUS RTU sets the unit to RTU and must also be used with the PARITY command. In RTU 8 DATA BITS are selected and if PARITY is EVEN or ODD then 1 STOP BIT is used, otherwise 2 with NONE 1 STOP BIT is used. MODBUS ASCII sets the unit to ASCII and must also be used with the PARITY command. In ASCII 7 DATA BITS are selected and if PARITY is EVEN or ODD then 1 STOP BIT is used, otherwise 2 with NONE 1 STOP BIT is used. |
| MODICT | 500 to 10000 | Sets the MODBUS ASCII Inter character timeout in milliseconds. MODICT <no parameter> returns the current value. MODICT 1000 – Is equivalent to a timeout of 1000 milliseconds (1 second). |
| MODTERM | 0 2 to 255 | Sets the MODBUS ASCII string termination MODTERM <no parameter> returns the current value. MODTERM 10 – Is equivalent to the ASCII character LF. MODTERM 27 - Is the equivalent to the ASCII character ESC. MODTERM 42 - Is the equivalent to the ASCII character * etc. |

| Command | Parameters | Description and examples |
|------------------|---|--|
| MSGMODE | CONT POLL | Sets the message-reporting mode. MSGMODE <no parameter> returns the current value. MSGMODE CONT - messages reported continuously. MSGMODE POLL - messages only reported when requested by the user (polled mode - see “?” command). |
| NODE | A B C to Z | Sets the unit Node address for unit recognition or Polling. NODE <no parameter> returns the current value. NODE A sets unit Node to A etc. |
| NODIR | NODIR X.XX | Sets a minimum velocity (in 0.01m/s steps). If the velocity is equal or less than this value then wind direction information is not displayed. This only affects polar output formats and the maximum value that can be set is 5.00. NODIR <no parameter> returns the current value (default 0.00). NODIR 0.50 sets the unit to not report wind direction at or below 0.50m/s. |
| OUTFREQ | 1/4HZ 1/2HZ 1HZ | Sets the unit data output rate in continuous mode. OUTFREQ<no parameter> returns the current value. OUTFREQ 1/4HZ -sets the unit to output 1 reading every 4 seconds. |
| PARITY | NO PARITY EVEN ODD | Sets up MetPak MODBUS PARITY (See also the MODBUS command). PARITY<no parameter> returns the current setting (NO PARITY/EVEN/ODD). PARITY NO PARITY sets MetPak MODBUS to No Parity. |
| PROTOCOL | GILL SDI12 NMEA0183 MODBUS | Sets the MetPak Output data string Protocol. PROTOCOL <no parameter> returns the current setting (GILL, SDI12, NMEA0183, MODBUS). PROTOCOL GILL sets MetPak to GILL output data string, setting changes will take place after the unit has been power cycled). |
| PUPMSG | STATUS ON OFF REPORT ON OFF UNITS ON OFF | Unit powers up in the state as define by parameter. PUPMSG (power up message) <no parameter> returns the current value, e.g. <i>STATUS, REPORT, UNITS</i> . PUPMSG STATUS - displays a firmware issue status message on power up e.g. <i>METPAK 2436 V4.00 STARTUP OK</i> PUPMSG STATUS OFF or ON- unit does not display (OFF) or does display (ON) a firmware issue status message on power up. PUPMSG REPORT - displays a header showing currently reported parameters e.g. <i>NODE,DIR,SPEED,PRESS,RH,TEMP,DEWPOINT,VOLT,STATUS,CHECK</i> PUPMSSG REPORT OFF or ON-unit does not display (OFF) or does display (ON) a header showing currently reported parameters. PUPMSG UNITS -displays a header showing the units of each field in the data output report. e.g. <i>-,DEG,MS,HPA,%,C,C,V,-,-</i> PUPMSG UNITS OFF or ON - does not display (OFF) or does display (ON) a header showing the units of each field in the data output report. NOTE. There is a power up message in polled mode unless turned off. Power up message is displayed when the unit is being powered up excepting if it has been deactivated. When the System is powered up allow for 9.5 seconds before the 1st line of Sensor data is output. |
| Q or QUIT | | Used to change the unit from SETUP to Measurement mode (see also EXIT) |

| Command | Parameters | Description and examples |
|-----------------|---|---|
| REPORT | FULL NODE DIR SPEED U-AXIS or V-AXIS PRESS TEMP RH DEWPOINT VOLT STATUS NMEA. | <p>Defines a reporting string. REPORT <no parameter> returns the current value, e.g. <i>NODE,DIR,SPEED,PRESS,RH,TEMP,DEWPOINT,VOLT,STATUS,CHECK</i> REPORT FULL - all instrument readings are output in the following default order: \uparrow Q,225,000.02,1023.4,041.8,+023.5,+009.8,+04.9,00,50 (Node, Direction, Wind Speed, Pressure, Humidity, Temperature, Dewpoint, Volts, Status, Checksum). REPORT NODE – reports the unit Node letter (default Q) REPORT DIR reports Polar Direction and Checksum only. REPORT SPEED reports Polar Speed and Checksum only. REPORT U-AXIS or REPORT V-AXIS reports U Axis Wind Speed or V Axis Wind Speed and Checksum only. REPORT PRESS -reports Pressure and Checksum only. REPORT TEMP - reports Temperature and Checksum only. REPORT RH - reports Relative Humidity and Checksum only. REPORT DEWPOINT reports Dewpoint and Checksum only. REPORT VOLT - reports Supply Voltage and Checksum only. REPORT STATUS - reports MetPak Unit status codes and Checksum only. REPORT NMEA – reports Wind (WIMWV data), Temperature, Relative Humidity and Barometric pressure (WIXDR data) in NMEA 0183 format. The MetPak Unit data string can be set up in any order with the required sensor outputs. For instance, if it is required to output data in the order Pressure, Polar Wind, Temperature, Humidity, Status. Type REPORT PRESS POLAR TEMP RH STATUS and press Enter. Gives \uparrow 1023.4,319,000.05,+023.5,038.3,00,1D NOTE. A Hex Checksum figure will always be reported.</p> |
| SERIAL | | Used to report the MetPak serial number. e.g. 00000008 |
| SWVER | | Returns the MetPak Unit Firmware version e.g. SWVER = 2436 V4.00 |
| STOPBITS | 1 or 2 | Sets the MODBUS STOP BITS to 1 or 2. DATABITS<no parameter> returns the current value. DATBITS 1 – Sets the data bits to 1 (See also the MODBUS Entry). |
| UNITS | WIND PRESS TEMP DEWPOINT RH | <p>Valid values are dependent on sensor type. A UNITS command with no parameter shall display a line of test showing the selected units of the current output string. Changes the output units for an individual sensor. UNITS <no parameter> - returns the current value, e.g. e.g. UNITS = -,DEG,MS,HPA,%,C,C,V,-,- UNITS WIND MS - selects metres/second for the wind reading. UNITS PRESS HPA - Selects hectoPascals for the pressure reading. UNITS TEMP C - selects centigrade for temperature reading. UNITS DEWPOINT C - selects centigrade for dewpoint reading. UNITS RH % - selects percentage for relative humidity See Table 11 for a list of unit abbreviations.</p> |

Table 11 Abbreviations used in UNIT configuration command

| UNITS measurement parameter | Unit | Abbreviation |
|-----------------------------|-------------------------|--------------|
| WIND | Metres per Second | MS |
| | Nautical Miles per Hour | KNOTS |
| | Miles per Hour | MPH |
| | Kilometres per Hour | KPH |
| | Feet per Minute | FPM |
| TEMP and DEWPOINT | Celsius | C |
| | Fahrenheit | F |
| | Kelvin | K |
| PRESS | HectoPascals | HPA |
| | MilliBars | MB |
| | Inches of Mercury | INHG |
| | Millimetres of Mercury | MMHG |
| RH | Relative Humidity | % |

3.3.4 Configuring MetPak for NMEA Output.

To configure a MetPak for RS422, 4800 Baud and NMEA 0183 output:

Either use MetSet and the Reporting and Comms pages or a Terminal program as follows:-

1. Place the MetPak into SETUP MODE as detailed on page 36.
2. Type **REPORT NMEA** and press Enter.
3. Type **BAUD 4800** and press Enter.
4. Type **COMMS RS422** and press Enter. Until the unit is restarted, the COMMS setting will remain unchanged.
5. Shut down the MetPak unit.
6. Change the hardware connections for RS422.
7. Restart the MetPak unit.

Example NMEA data string produced at the output rate (default every 1Hz):-

```
$WIMWV,008,R,000.09,N,A*0C
$WIXDR,C,+023.0,C,TEMP,P,1.0199,B,PRESS,H,039.6,P,RH*33
```

The NMEA data string comprises of: -

```
$WIMWV,008,R,000.09,N,A*0C,<CR>,<LF>
```

Where: -

| | |
|---------|---|
| \$WIMWV | Wind Instrument Mean Wind direction and Velocity |
| 008 | Wind Direction |
| R | Wind Measurement Relative to the North Marker |
| 000.09 | Wind Speed |
| N | Knots (NMEA output fixed to Knots measurement only) |
| A | Acceptable measurement (V is a void fail measurement) |
| 0C | Hex CheckSum |

And

```
$WIXDR,C,+023.0,C,TEMP,P,1.0199,B,PRESS,H,039.6,P,RH*33,<CR><LF>
```

Where: -

| | |
|---------|--|
| \$WIXDR | Wind Instrument Cross track error Dead Reckoning |
| C | Type of Sensor (Temperature) |
| +023.0 | Temperature Reading |
| C | Temperature Reading in Degrees Centigrade |
| TEMP | Name of Temperature Sensor |
| P | Type of Sensor (Pressure) |
| 1.0199 | Pressure Reading in Bars. |
| B | Pressure Units of Measure (Bars) |
| PRESS | Name of Pressure Sensor |
| H | Type of Sensor (Humidity) |
| 039.6 | Humidity Reading in Percent |
| P | Humidity Units of Measure (Percent) |
| RH | Name of Relative Humidity Sensor |
| 33 | Hex CheckSum |

<CR> is a Carriage return character (ASCII hex value d)

<LF> is a Line Feed Character (ASCII hex value a)

Checksum, the 2 digit Hex Checksum sum figure is calculated from the Exclusive OR of the bytes between (and not including) the \$ and * characters.

3.3.5 Configuring MetPak for SDI-12

To configure a MetPak unit for SDI-12:

1. Connect a MetPak to a PC as described in Para 2.2.4.
2. Open MetSet as described on Para 3.3.1.
3. Click on the Edit Comms page and select SDI-12 from the drop down menu.
4. Click on Save Settings to Device on the Online Mode Menu.
5. Power down the MetPak unit.
6. Change the hardware connections for SDI-12.
7. Power up the MetPak unit.

3.3.6 SDI-12 Commands

SDI-12 Command Summary

- ?! Unit Address (default is 0).
- aAb! Change unit address (a = 0)
- aM! Wind Direction/Speed (direction in Degrees, speed in Metres/Sec), Temperature (degrees C), Pressure (Hecto Pascals/millibars) and Humidity (%).
- aM1! Wind Direction/Speed (direction in Degrees, speed in Metres/Sec), Temperature (degrees C), Pressure (Hecto Pascals/millibars) and Dewpoint (degrees C).
- aM2! Wind Direction/Speed (direction in Degrees, speed in Metres/Sec) and a 2 digit Status Code.
- aM3! Temperature (degrees C), Pressure (Hecto Pascals/millibars) and Dewpoint (Degrees C).
- aM4! Pressure (Hecto Pascals/millibars).
- aM5! to aM8! For future use.
- aM9! Power Supply Voltage (Volts).
- aMC! Wind Direction/Speed (direction in Degrees, speed in Metres/Sec), Temperature (degrees C), Pressure (Hecto Pascals/millibars), Humidity (%) and CRC.
- aMC1! Wind Direction/Speed (direction in Degrees, speed in Metres/Sec), Temperature (degrees C), Pressure (Hecto Pascals/millibars), Dewpoint (degrees C) and CRC.
- aMC2! Wind Direction/Speed (direction in Degrees, speed in Metres/Sec), a 2 digit Status Code and CRC.
- aMC3! Temperature (degrees C), Pressure (Hecto Pascals/millibars), Dewpoint (Degrees C) and CRC.
- aMC4! Pressure (Hecto Pascals/millibars) and CRC.
- aMC5! to aMC8! For future use.
- aMC9! Power Supply Voltage (Volts) and CRC.
- aD0! Request a line of the above data.

SDI-12 Command Details

| Command | Description | Response | Example |
|-------------|--|---|--|
| ?! | Unit Address | a<CR><LF> | 0<CR><LF> |
| aAb! | Change the unit address a = 0, the default. b = the new address. | b<CR><LF> | 1<CR><LF> |
| aM! | Wind Direction/Speed (direction in Degrees, speed in Metres/Sec), Temperature (degrees-C), Pressure (Hecto Pascals/millibars) and Humidity (%). | attn<CR><LF> a is unit identifier. ttt is time in seconds. n is number of data values. Measurement command to retrieve a reading of the maximum time the MetPak will take to complete a measurement, have data ready and the number of data values. | 00055<CR><LF> 0 is unit identifier. 005 is 5 sec. measurement. 5 is the number of data readings (Direction, Speed, Temperature, Pressure and Humidity). |
| 0D0! | Retrieve a line of the above data. | a<dir><mag><temp><pressure><humidity><CR><LF> | 0+220+000.01+021.6+1013.0+041.9<CR><LF> |
| aM1! | Wind Direction/Speed (direction in Degrees, speed in Metres/Sec), Temperature (degrees C), Pressure (Hecto Pascals/millibars) and Dewpoint (degrees C). | atttn<CR><LF> | 00055<CR><LF> |
| 0D0! | Retrieve a line of the above data. | a<dir><mag><temp><pressure><dewpoint><CR><LF> | 0+357+000.03+021.6+1013.0+008.0<CR><LF> |
| aM2! | Wind Direction/Speed (direction in Degrees, speed in Metres/Sec) and a 2 digit Status Code. | atttn<CR><LF> | 00053<CR><LF> |
| 0D0! | Retrieve a line of the above data. | a<dir><mag><status><CR><LF> | 0+029+000.01+00<CR><LF> |
| aM3! | Temperature (degrees C), Humidity (%), Dewpoint (Degrees C). | atttn<CR><LF> | 00053<CR><LF> |
| 0D0! | Retrieve a line of the above data. | a<temp><humidity><dewpoint><CR><LF> | 0+21.6+041.0+0007.8<CR><LF> |
| aM4! | Pressure (Hecto Pascals/millibars). | atttn<CR><LF> | 00051<CR><LF> |
| 0D0! | Retrieve a line of the above data. | a<pressure><CR><LF> | 0+1013.0<CR><LF> |
| aM9! | Power Voltage (Volts) | atttn<CR><LF> | 00011<CR><LF> |
| 0D0! | Retrieve a line of the above data. | a<voltage><CR><LF> | 0+12.5<CR><LF> |

| Command | Description | Response | Example |
|--------------|---|---|---|
| aMC! | Wind Direction/Speed (direction in Degrees, speed in Metres/Sec), Temperature (degrees-C), Pressure (Hecto Pascals/millibars) Humidity (%) and CRC. | attn<CR><LF> a is unit identifier. ttt is time in seconds. n is number of data values. Measurement command to retrieve a reading of the maximum time the MetPak will take to complete a measurement, have data ready and the number of data values. | 00056<CR><LF> 0 is unit identifier. 005 is 5 sec. measurement. 6 is the number of data readings (Direction, Speed, Temperature, Pressure, Humidity and CRC). |
| 0D0! | Retrieve a line of the above data. | a<dir><mag><temp><pressure><humidity><CRC><CR><LF> | 0+139+000.06+022.2+1017.8+042.7+00BIQ<CR><LF> |
| aMC1! | Wind Direction/Speed (direction in Degrees, speed in Metres/Sec), Temperature (degrees C), Pressure (Hecto Pascals/millibars), Dewpoint (degrees C) and CRC. | atttn<CR><LF> | 00056<CR><LF> |
| 0D0! | Retrieve a line of the above data. | a<dir><mag><temp><pressure><dewpoint><CRC><CR><LF> | 0+140+000.06+022.2+1017.7+009.0+00D{Z<CR><LF> |
| aMC2! | Wind Direction/Speed (direction in Degrees, speed in Metres/Sec), a 2 digit Status Code and CRC. | atttn<CR><LF> | 00053<CR><LF> |
| 0D0! | Retrieve a line of the above data. | a<dir><mag><status><CRC><CR><LF> | 0+098+000.04+00@sh<CR><LF> |
| aMC3! | Temperature (degrees C), Humidity (%), Dewpoint (Degrees C) and CRC. | atttn<CR><LF> | 00053<CR><LF> |
| 0D0! | Retrieve a line of the above data. | a<temp><humidity><dewpoint><CRC><CR><LF> | 0+022.2+042.7+009.0LV{<CR><LF> |
| aMC4! | Pressure (Hecto Pascals/millibars) and CRC. | atttn<CR><LF> | 00051<CR><LF> |
| 0D0! | Retrieve a line of the above data. | a<pressure><CRC><CR><LF> | 0+1017.8GM <CR><LF> |
| aMC9! | Power Voltage (Volts) and CRC | atttn<CR><LF> | 00011<CR><LF> |
| 0D0! | Retrieve a line of the above data. | a<voltage><CRC><CR><LF> | 0+12.2K@R<CR><LF> |

3.3.7 Configuring MetPak for MODBUS

MetPak Supported Modbus Specification

MODBUS RTU or ASCII.
 Baud Rate 9600 or 19200 Baud.
 COMMS RS232 point to point only, RS485 2 wire networkable.
 Modbus Parameters ASCII or RTU.

| Parameter | Modbus ASCII | Modbus RTU |
|-----------------|-------------------------------------|-------------------------------|
| Character | ASCII 0 to 9 and A to F (Hex) | Binary 0 to 255 |
| Error Check | Longitudinal Redundancy Check (LRC) | Cyclic Redundancy Check (CRC) |
| Frame Start | Character ':' (3A Hex) | 3.5 Characters Silence |
| Frame End | Characters CR/LF (0D/0A Hex) | 3.5 Characters Silence |
| Gaps in Message | 1 Second | 1.5 Times Character Length |
| Start Bit | 1 | 1 |
| Data Bits | 7 | 8 |
| Parity | Even/Odd | None |
| Stop Bits | 1 | 2 |

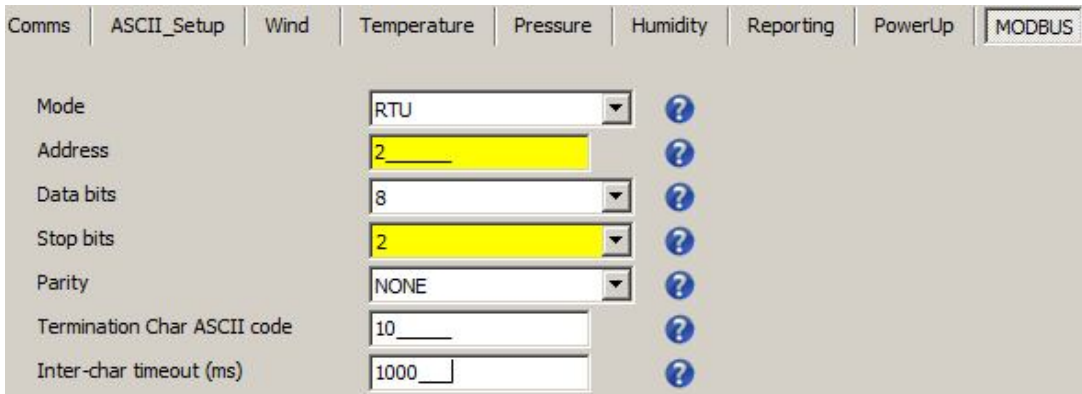
Requires:-

MetPak with version 2346-4.00 firmware and onwards.
 MetSet Software version 2.02-02 and onwards.
 Connect a MetPak to a PC COM port (default communication is RS232).
 Open Gill MetSet Software.
 Click on Connect and Read to reach the Editing Pages as shown below.

Configuration

Click on the MODBUS Page

Mode: Choose between RTU and ASCII, in this case RTU.
 Address: Choose a MetPak Address number to be between 1 to 247.
 Data Bits: Choose 7 for Modbus ASCII and 8 for Modbus RTU.
 Stop Bits: Choose 1 for Even/Odd Parity or 2 for No Parity.
 Parity: Choose Even/Odd or None.
 Termination Char ASCII code: Choose between 0-255.
 Inter Char Timeout (ms): Choose between 500ms to 10000ms.



Select the COMMS Page

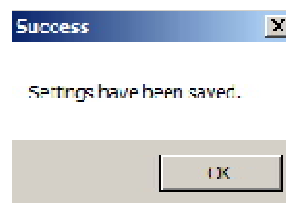
- Protocol: Default is Gill. Select MODBUS
- Interface: Default is RS232. Select RS232 or RS4852W. RS232 will only allow a single point to point non multi drop network connection. RS485 2 wire will allow networking with up to 32 connected devices.
- Baud Rate: Default is 19200. Select required Baud rate (9600 or 19200 supported).
- Node ID: Default is Q. Not used for MODBUS.
- Output Rate: Default is 1Hz. Set update rate for MetPak Data (0.25Hz to 1Hz).
- Message Mode: Default is CONT. Select POLL mode and MetPak will only make and output a measurement (set by the output rate) on demand from the Modbus Master. In CONTinuous mode the MetPak continuously makes measurements set by output rate (0.25Hz to 1Hz) and only outputs a result when demanded from the Modbus Master.



When required settings have been selected click on Save Settings to Device



Click on Yes and OK.



Power down the MetPak and apply power back to the MetPak to complete setting changes.

Note: now that the unit is in MODBUS mode if any further changes need to be made use the SAFE MODE connection and method to re-establish communication with MetSet.

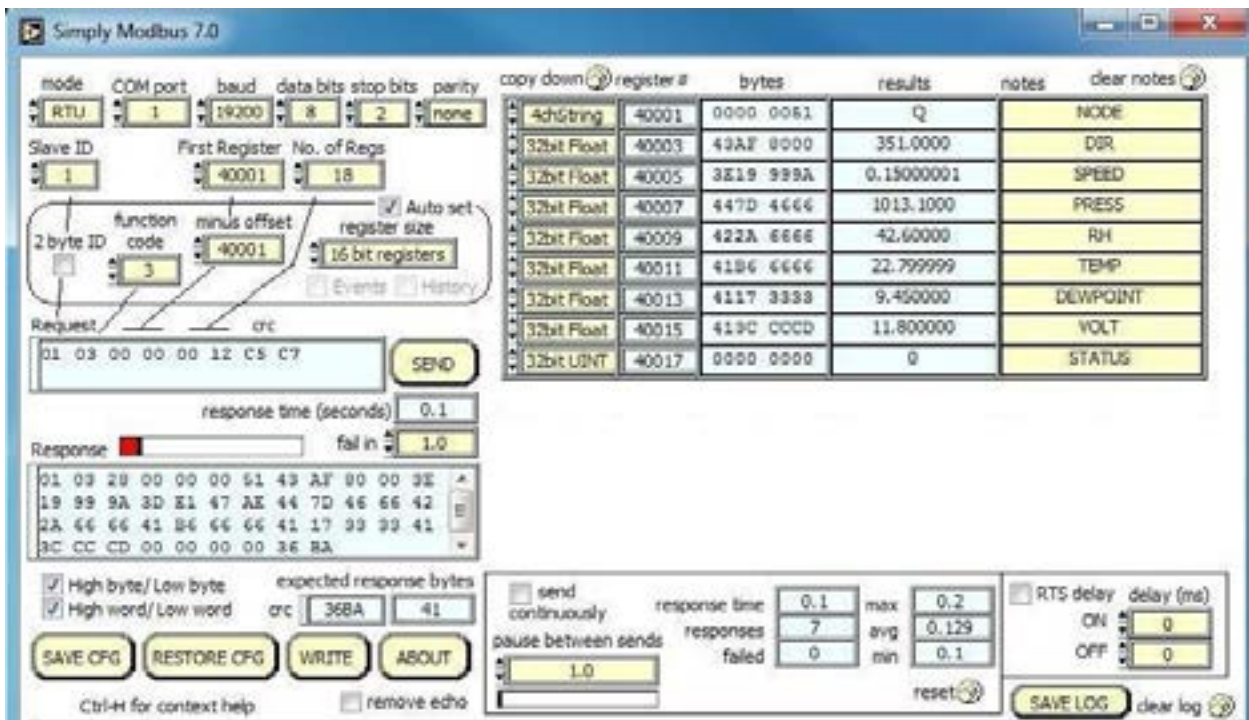
METPAK MODBUS NOTES

1. All registers are 16bit.
2. The first byte is high order and the second is low.
3. Each measurement is comprised of two 16bit registers.
4. The registers are arranged High Word/ Low Word.
5. Registers start at address 40001.
6. Holding registers available in the order of the MetPak data string (which can be established by the REPORT command in non-Modbus Gill ASCII Mode).

MetPak MODBUS Default Data String Field Encoding:

| | | |
|--------------------|--------------------------------|---------------------|
| Node | 4-byte character string | Registers 40001-2. |
| Direction: | 32 Bit Floating point value | Registers 40003-4. |
| Speed: | 32 Bit Floating point value | Registers 40005-6. |
| Pressure: | 32 Bit Floating point value | Registers 40007-8. |
| Temperature: | 32 Bit Floating point value | Registers 40009-10. |
| Relative Humidity: | 32 Bit Floating point value | Registers 40011-12. |
| Dewpoint: | 32 Bit Floating point value | Registers 40013-14. |
| Supply Voltage: | 32 Bit Floating point value | Registers 40015-16. |
| Status: | 32 bit Unsigned Integer (UINT) | Registers 40017-18. |

See Simply Modbus program reading example MetPak MODBUS Data as follows:-



3.3.8 Safe Mode

Summary

The MetPak Safe Mode provides a means of recovering communication with the MetPak whatever configuration setting may have been made. For instance if the unit has been set for SDI-12 or MODBUS operation Safe Mode can be used to change the communication option back to RS232, RS422 or RS485.

Connection

Connect the MetPak for RS232 communication as detailed on Page 10, Figure 6.

Method

Note at this stage the MetPak supply to be switched off.

Open a Terminal program e.g. Gill WIND Software
(<http://www.gill.co.uk/main/software.html>) or Windows HyperTerminal

Note if using Gill Wind Software that the Tools features are not applicable.

Open Gill Wind Software.

Serial Port: Set the drop down menu to the required COM Port Connection.

Click on the **OK** button.

Baudrate: Set the drop down menu to **4800** Bauds.

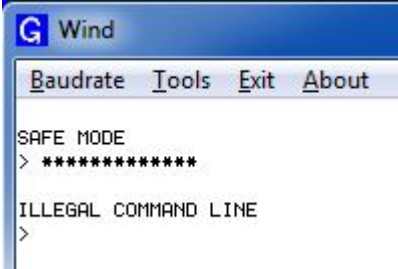
A blank Wind Terminal screen will be opened.

Hold down the * key on the keypad.

With the * key still held down, apply power to the MetPak.

This will result in placing the unit into SAFE MODE.

Press Enter to start a new line (Ignore illegal command line).



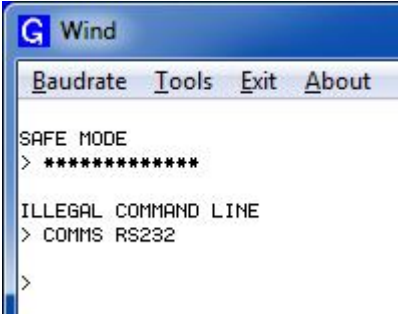
```

G Wind
Baudrate Tools Exit About
SAFE MODE
> *****
ILLEGAL COMMAND LINE
>

```

To now change communication from SDI-12 to RS232.

Type COMMS RS232 and press Enter.



```

G Wind
Baudrate Tools Exit About
SAFE MODE
> *****
ILLEGAL COMMAND LINE
> COMMS RS232
>

```

Type Q and press Enter to exit Safe Mode.

Data will now scroll on screen.

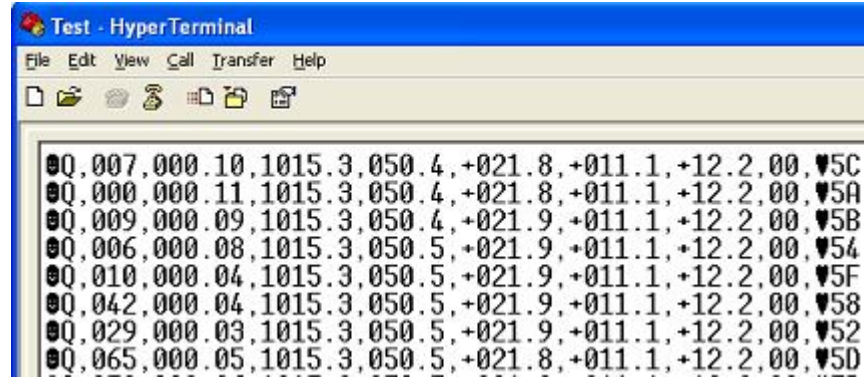
Note however for RS232 changes to take place the unit must be powered down and back up again.

Close the 4800 baud rate Wind or HyperTerminal Program.

Power down the MetPak and re-apply power.

Open a new Wind or HyperTerminal program at **19200-baud** rate.

RS232 data will now scroll on screen at the MetPak default 19200-baud rate.



The * command can now be used if required to place the unit into SETUP mode and make any other changes to the MetPak configuration.

4. Troubleshooting

4.1 Fault-Finding

Common Problems

Table 12 Common problems and their solution

| Symptom | Solution |
|---|--|
| No output | Check DC power to MetPak, cable and connections. Check communications settings of the MetPak and host system match, including correct Com port. Check that the unit is in Continuous mode. Check that in-line communication devices are wired correctly. NOTE: It is usual for the MetPak TX + to be connected to converter device RX +. If appropriate use Safe Mode to attempt to obtain communication with the MetPak. |
| Corrupted output | Check that the communication settings of the MetPak and host system match. Try a slower baud rate. Check cable lengths and type of cable. |
| One way communication | Check that the wiring is in accordance with the manual. |
| Unexpected Temperature /Dewpoint readings | Check that the Temperature and Dewpoint units of measure (C, F, K) settings are correct on power up. |
| Unexpected Wind readings | Check that the Wind Sensor units of measure (m/s, knots, kph, ft/min, mph) settings are correct on power up. |
| Unexpected Temperature/Dewpoint and Humidity readings | Check that the HygroClip filter is clean. |
| Unexpected Barometer Readings | Check that the Hub Box Gortex filter is not blocked. |
| Status code not 00 or A | See Table 13 |

Table 13 Status codes as output with the MetPak data string

| Code | Status | Condition |
|------|--|--|
| 00 | OK | No fault conditions detected in measurement period. |
| A | Acceptable data (NMEA Mode) | No fault conditions detected in measurement period. |
| 01 | Wind Sensor Axis 1 failed | U Axis blocked or faulty. |
| 02 | Wind Sensor Axis 2 failed | V Axis blocked or faulty. |
| 04 | Wind Sensor Axis 1 and 2 failed | U and V axis blocked or faulty |
| 08 | Wind Sensor NVM error | Non Volatile Memory checksum failed, data could be uncalibrated. |
| 09 | Wind Sensor ROM error | Read Only Memory checksum failed, data could be uncalibrated. |
| 0B | Wind Sensor reading failed. | Wind Sensor faulty. |
| 10 | HygroClip error | HygroClip faulty. |
| 20 | Dewpoint error | Hub Pec faulty. |
| 40 | Humidity error | HygroClip faulty. |
| 66 | Wind Sensor Power | Check Wind Sensor is powered |
| 67 | Wind Sensor RS232 Communications | Check RS232 communication wiring |
| 80 | Pressure Sensor Warning | Pressure sensor reading not available/unit faulty. |
| XX | More than one fault | Fault condition that can be the sum of 0B,10, 20 or 40. e.g 1B would mean that both the Wind Sensor (0B) and HygroClip (10) were faulty. |
| V | Void Data, Wind Sensor reading failed. (NMEA Mode) | Wind Sensor faulty. |

4.2 Servicing

In the event of failure, prior to returning to an authorised Gill distributor it is recommended to:

1. Check all cables and connectors for continuity, bad contact, corrosion etc.
2. Carry out a bench test as described in the next section.

Contact your supplier if a fault persists.

4.3 Bench Tests

Carry out a bench test as follows:

1. Connect the MetPak unit to the host PC and power supply, using a known working test cable.
2. Check that the unit is correctly configured by going into Set Up mode (see page 36).
3. Check for normal output data, and that the Status Code is OK – 00 or A.
4. If the status code is other than 00 or A, refer to Table 13 for a list of status (error) codes.
5. Use an office fan or similar to check that the unit is sensing wind, turning the unit to simulate changing wind direction and to check that both axes are functioning.
6. Check for output changes in temperature and relative humidity sensor (the fan will also cause small changes in these properties).

5. Maintenance



Wind Sensor General (WindSonic)

If there is any build-up of deposits on the unit, it should be gently cleaned with a cloth, moistened with soft detergent. Solvents should not be used, and care should be taken to avoid scratching any surfaces. The unit must be allowed to defrost naturally after being exposed to snow or icy conditions, do NOT attempt to remove ice or snow with a tool.

There are no moving parts or user-serviceable parts requiring routine maintenance.

Opening the unit or breaking the security seal will void the warranty and the calibration.

UV Shield (MetSpec Model Rad 16)

If there is any build-up of deposits on the unit, it should be gently cleaned with a cloth, moistened with soft detergent. Solvents should not be used, and care should be taken to avoid scratching any surfaces. The unit must be allowed to defrost naturally after being exposed to snow or icy conditions, do NOT attempt to remove ice or snow with a tool.

HygroClip for Temperature, Humidity and Dewpoint (Rotronic Model HC2-S3-GI)

For extreme environments such as maritime installations, chemical plants or other areas of high pollution or contamination, Gill highly recommend replacement of the temperature and humidity probe filter every 6 months to 12 months to ensure proper performance.

Corroded, discoloured or clogged dust filters should be replaced.

If the filter is not replaced it is very likely you will see elevated humidity levels with time and if this is allowed to develop for a longer period of time it can lead to permanent damage on the electronics of the temperature probe due to the very high moisture content and corrosive effect of the pollutant or salt.



Rotronic Temperature and Humidity filter replacement:

The Rotronics polycarbonate dust filter screw-on cap is available from:-

| | | |
|------------------|-------------|--------------------------|
| Gill Instruments | Part Number | 1723-PK-025 (2 filters). |
| Rotronic | Part Number | NSP-PCW-PE (1 filter). |

If you need to replace the dust filter cap, carefully unscrew it and withdraw carefully avoiding contact with the Temperature and Humidity circuit board. When re-fitting the filter cap, ensure the circuit board connections are not bent.

Consideration should be given to an annual calibration check of the HygroClip sensor by the manufacturer.

If you are replacing the whole cartridge, unscrew the metal ferrule and return the probe to Rotronic for calibration. Refer to the Rotronic Website for more details:

<http://www.rotronic-humidity.com/content/meta/kontakt.php>



NOTE. If you return the sensor to a HygroClip supplier for exchange, please request that the return unit has the dewpoint feature enabled (HCS2-S3-GI).

Barometer (on Hub PCB)

The Barometer device is maintenance-free, however, if required observe the following with regard to the central Hub box screw cap Gore-Tex[®] filter.

Pressure Sensor Filter Replacement:

There is a small venting filter for the pressure sensor of the MetPak located on the 'Hub' box lid which ensures proper conditions are present in the MetPak 'hub' box for pressure measurements without allowing any moisture or other damaging pollutants into the box. This filter is made from Gore-Tex[®] material and is designed to last a long time without replacement, however, Gill do recommend that this filter is replaced every 24 months to ensure proper operation of the pressure sensor and to keep the electronics inside the 'hub' box dry.

If you do not replace the filter every 24 months you may start to see elevated or erroneous readings of the pressure sensor with time and this behaviour can be corrected by replacement of the Gore-Tex[®] filter unit.



The Gore-Tex[®] filter kit is available from:-

Gill Instruments Part Number 1723-PK-024.

To replace the filter, unscrew the 4 screws retaining the hub box lid. Remove the existing Gore-Tex filter and M12 Nut. Fit and secure the new filter with the nut provided. Re-fit the 4 lid screws.

Should you be uncertain as to how often you should be replacing the filters for your application or if you wish to discuss this in more detail please contact Gill support and we will be able to provide a recommendation for you.

Spare Parts

| | |
|-------------|---|
| 1723-10-051 | RS232 to USB 1.8M configuration cable (both units). |
| 1723-PK-024 | Pressure Sensor Filter Spares kit. |
| 1723-PK-025 | Hygroclip Filter Replacement Kit (2 Filters). |

Returning the MetPak

If the unit has to be returned, it should be carefully packed in the original packaging and returned to your authorised Gill distributor, with a full description of the fault condition. An RMA number should be obtained from Gill Instruments first if returning directly to Gill Instruments.

6. Technical Information

6.1 Specification

| Wind Measurement | |
|----------------------|---|
| Parameters | Polar Wind Speed & Direction or U and V Vectors |
| Units of Measurement | m/s, knots, mph, kph, ft/min |

| Wind Speed | |
|------------|--------------------|
| Range | 0-60m/s (0-134mph) |
| Accuracy | ± 2% @ 12m/s |
| Resolution | 0.01m/s (0.02mph) |
| Threshold | 0.01m/s (0.02mph) |

| Wind Direction | |
|----------------|------------------------------|
| Range | 0-359 Degrees – No dead band |
| Accuracy | ± 3° @ 12m/s |
| Resolution | 1° |

| Air Temperature | |
|------------------|-------------------|
| Type | Pt100 1/3 Class B |
| Range | -35°C to + 70°C |
| Accuracy | ±0.1°C |
| Resolution | 0.1°C (0.1°F) |
| Units of Measure | °C or °F |

| Relative Humidity | |
|-------------------|--------------|
| Range | 0-100% |
| Accuracy | ±0.8% @ 23°C |
| Resolution | 0.1% |
| Units of Measure | % RH |

| Dew Point | |
|------------------|--|
| Resolution | 0.1°C (0.1°F) |
| Accuracy | ±0.15°C (23°C ambient temp @ 20°C dew point) |
| Units of Measure | °C or °F |

| Barometric Pressure | |
|---|--|
| Range | 600 to 1100hPa |
| Accuracy | ±0.5hPa |
| Resolution | 0.1hPa |
| Units of Measure | hPa, mbar, mmHg, InHg |
| Compensated for Temperature dependency –30°C to +70°C | |
| Outputs | |
| Digital Outputs | RS232, RS422, *RS485 (*2 wire point to point) or SDI-12 (RS232 point to point and RS485 2 wire networkable – MODBUS RTU/ASCII) |
| Baud Rates | 1200 (SDI-12), 4800-57600 (ASCII RS232, RS422, *RS485) 9600-19200 (MODBUS RTU/ASCII) |
| Protocols | ASCII, SDI-12 V1.3, NMEA 0183 or MODBUS RTU/ASCII |
| Data Output | 0.25, 0.5, 1 Hz or Polled Mode |
| MetPak Status | Status codes provided within the data message string |
| Power Supply | |
| Input voltage (RS232, RS422, RS485) | 4.5v to 30v dc |
| Current | 16mA at 12v (default setting) |
| Input voltage (SDI-12) | 9.6v to 16v dc (12v nominal) |
| Current | 6.5mA |
| Environmental | |
| Protection Class | IP65 |
| EMC | EN 61326 |
| Operating Temperature | -35°C to +70°C |
| Storage Temperature | -40°C to +80°C |
| Humidity | 0-100% |
| Mechanical | |
| External Construction | Bracket, Anodised Aluminium (for WindSensor and Hygroclip mountings). |
| Fittings | Stainless steel 316 bracket fittings supplied for clamping unit to a vertical pipe of diameter 30mm to 58mm. |
| Overall Dimensions | 364mm x 287mm x 142mm (excluding bracket clamp) |
| Weight | 2.2kg (including bracket) |
| Software | |
| MetView Display | Free Software providing the means of displaying data and logging data |
| MetSet Configuration | Free Software providing the means of configuration of the MetPak |

6.2 Hub PCB Connections

The following tables summarise the connections for:

- HygroClip (Factory connections).
- WindSonic Anemometer (Factory connections MetPak)
- RS232/RS422/RS485 and SDI-12 communications (User Connections)

Connection details are also found on the hub box lid.

Table 14 HygroClip connections (6-way connector J1)

| Connector J1 | Wire Colour | Signal Name |
|--------------|-------------|-------------------------|
| 1 | - | No Connection |
| 2 | Blue | RXD from HygroClip UART |
| 3 | Red | TXD to HygroClip UART |
| 4 | Yellow | Analogue 0V (Not Used) |
| 5 | Grey | Supply/Signal 0V |
| 6 | Green | Supply +ve (+3.3V DC) |

Table 15 MetPak WindSonic anemometer connections (8-way connector J4)

| Connector J4 | Wire Colour | Signal Name |
|--------------|-------------|------------------------------------|
| 1 | - | No Connection |
| 2 | - | No Connection |
| 3 | Blue | RS232 TX+ Anemometer Output to Hub |
| 4 | White | RS232 RX+ Hub Output to Anemometer |
| 5 | Green | Signal 0v |
| 6 | Yellow | Supply 0v |
| 7 | - | No Connection |
| 8 | Red | Supply +ve (4.5v to 30V dc) |

Table 16 PC communications (8-way connector, J5)

| Connector J5 | Signal Name |
|--------------|---|
| 1 | SDI-12 TX/RX |
| 2 | Signal 0V |
| 3 | RS232 TX- , (or RS422/485 TX-) HUB to user |
| 4 | RS232 RX- , (or RS422/485 RX-) User to HUB |
| 5 | RS422/485 RX+, User to HUB |
| 6 | RS422/RS485 TX+, HUB to User |
| 7 | Supply 0v |
| 8 | Supply +ve (4.5v to 30v dc) |



NOTE. J2, a 12-way expansion board connector and J3, a 5-way connector are not used in the current version

6.3 Electrical Conformity Certificate

**EC DECLARATION OF CONFORMITY
ACCORDING TO COUNCIL DIRECTIVE
2004/108/EC**

GILL

We, Gill Instruments Ltd., declare under our sole responsibility that the products:

MetPak Weather Station

Manufactured by: Gill Instruments Ltd

to which this declaration relates, are in conformity with the protection requirements of Council Directive 2004/108/EC on the approximation of the laws relating to electromagnetic compatibility.

This Declaration of Conformity is based upon compliance of the product with the following harmonised standards:

Emissions EN61326
Immunity EN61326 (excludes 150kHz to 250kHz)

Signed by:



A.C.R. Stickland – Director

Date of issue: 20/12/2012

Place of issue: Gill Instruments Ltd
Saltmarsh Park, 67 Gosport Street,
Lymington, SO41 9EG, UK

