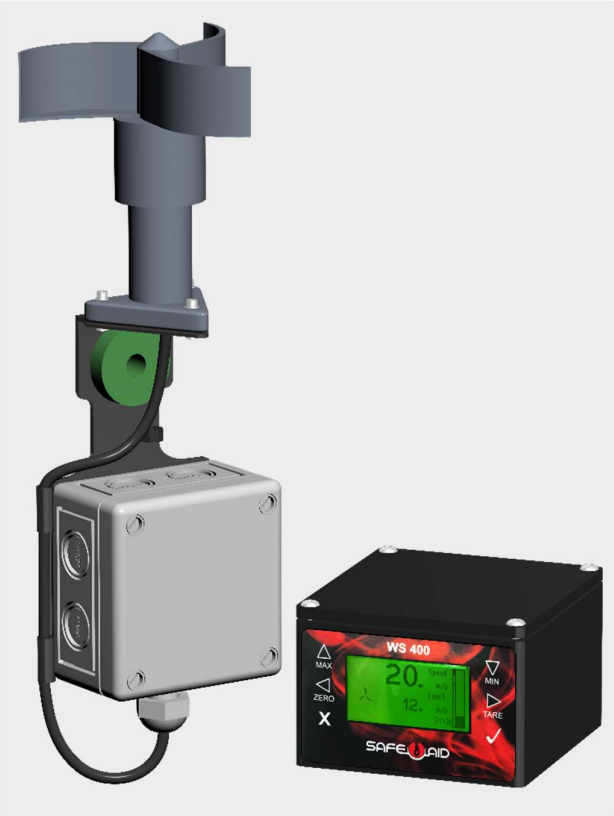
WS400 WIRELESS ANEMOMETER

Installation & Setup Manual

Version 2



THE COMPLETE WS400 WIRELESS WIND SPEED SYSTEM HAS BEEN PRE-ASSEMBLED, AND THE FOLLOWING MANUAL WILL AID IN THE INSTALLATION & SETUP PROCESS

! WARNING !

THE PURPOSE OF THIS MANUAL IS TO PROVIDE THE CUSTOMER WITH THE OPERATING PROCEDURES ESSENTIAL FOR THE PROMOTION OF PROPER MACHINE OPERATION FOR ITS INTENDED USE. THE IMPORTANCE OF PROPER USAGE CANNOT BE OVERSTRESSED. ALL INFORMATION IN THIS MANUAL SHOULD BE READ AND UNDERSTOOD BEFORE ANY ATTEMPT IS MADE TO OPERATE THE MACHINE.

SINCE THE MANUFACTURER HAS NO DIRECT CONTROL OVER MACHINE APPLICATION AND OPERATION, CONFORMANCE WITH GOOD SAFETY PRACTICE IN THIS AREA IS THE RESPONSIBILITY OF THE USER AND HIS OPERATING PERSONNEL.

ALL PROCEDURES ARE BASED ON THE USE OF THE SYSTEM UNDER PROPER OPERATING CONDITIONS, WITH NO DEVIATIONS FROM THE ORIGINAL DESIGN. ALTERATION AND OR MODIFICATION OF THE EQUIPMENT IS STRICTLY FORBIDDEN WITHOUT PRIOR WRITTEN APPROVAL.

Contents

SYSTEM COMPONENTS:

- Anemo 4403 Anemometer
  - Head unit (with vanes) & 360mm Cable with connector
  - Stainless Steel bracket with Oilon bush and washer
  - IP65 Enclosure with wireless communication board & Size D 3.6V Lithium battery (Battery not included for export).
- Mounting pole (M10 threaded bar) with mounting foot, lock nuts & washers.
- WS400 Display Unit enclosed in housing complete with mounting bracket & 3 meters of 2 core cable for power supply with AT series plugs for easy connection.

DISPLAY MOUNTING INSTRUCTIONS:

TOOLS REQUIRED:

1 x Power Hand Drill
1 x 7mm Drill Bit
1 x 5mm Hex Head Allen Key
1 x 10mm Spanner

PROCEDURE:

1. The display unit must be always mounted in the 'best line of site' to the anemometer; this must be in an easily viewable and accessible place. The display can be mounted in virtually any suitable place by using the bracket which is attached to the back of the housing.

2. Remove the two M6 x 30mm socket head cap screws and nuts supplied with the mounting bracket. Place the bracket where it is to be mounted and mark two mounting holes using 2 of the large holes. Drill two 7mm holes and fasten the mounting bracket using two M6 screws and nuts. Fasten the screws through the bracket using a 10mm spanner and 5mm Hex Head Allen key.

3. Locate a suitable fuse protected power source to power the display unit (2A for the display only). Route the two-core cable to the fused power source and connect the numbered wires as indicated:

   - Wire #1 - + Supply (6-36VDC)
   - Wire #2 - - Supply (Earth/Ground)

DISPLAY BOARD POWER SUPPLY WIRING

Power supply cable for the WS400 display unit is prewired on delivery. If any changes are required, please use the below tools and procedures to carry out any changes.

Ensure that the display power is OFF while the following procedure is carried out.

TOOLS REQUIRED:

1 x 2.5mm Hex Head Allen key
1 x 2mm Flat Head Screwdriver

PROCEDURE:

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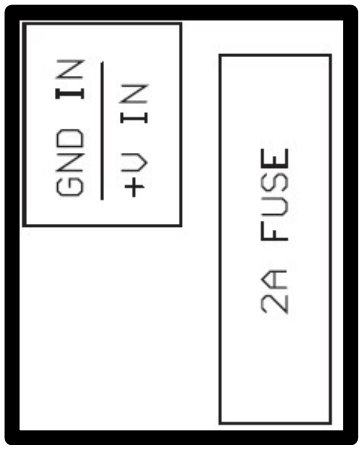

Figure 1

1. Remove Display Cover
2. Make sure the 2A blade fuse is not damaged and is inserted securely.
3. Connect the power wires to the following terminals using the 2mm flat head screwdriver:

   - +V IN - Wire #1 - + Supply (6 - 36VDC)
   - GND IN - Wire #2 - - Supply (Earth/Ground)

4. To close the display:

   - Ensure all power wires are securely in the terminals.
   - Gently pull wire(s) back through glands until slack has been taken up and then tighten gland(s).
   - Replace Display Cover

CONNECTING RELAY OUTPUTS

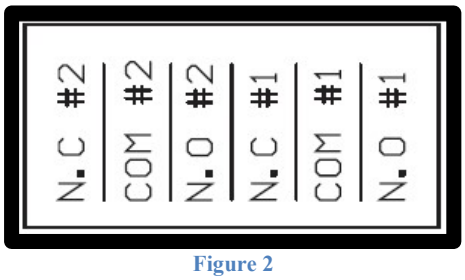

Figure 2

The WS400 display unit has provision for wiring up external lights and/or siren using the two relays mounted on the display board.

- Relay 1 - equal to or exceeding the intermediate limit
- Relay 2 - equal to or exceeding the upper limit

To set up the relevant limits see Windspeed & Unit Setup.

The contact block is situated inside the display unit on the board and the contacts utilsed are as follows:

RELAY # 1 (Upper Limit)

- N.C #1 – Normally Closed Contact
- COM #1 – Common
- N.O #1 – Normally Open Contact

RELAY # 2 (Intermediate Limit)

- N.C #2 – Normally Closed Contact
- COM #2 – Common
- N.O #2 – Normally Open Contact

TOOLS REQUIRED:

1 x 2.5mm Hex Head Allen key
1 x 2mm Flat Head Screwdriver

PROCEDURE:

Connection can be done to both outputs (intermediate and upper) or individually as required.

1. Open the display box as per the Display Board Power connector wiring.

2. Replace M12 blank-off on back of display with M12 gland as required for output wiring.

3. Establish the relay output required by the device – Maximum 3A @ 30VDC.

4. Connect the required output to the common on the contact block – Preferably use a separate supply but if low power (less than 3 Amps) or ground feed is required connect a wire directly from the supply or ground into the Common on the relevant relay.

5. Common signal will now be directed through the relevant relay as follows:
   - Normally Open (NO) - Limit Reached will close contact
   - Normally Closed (NC) - Limit Reached will open contact

MOUNTING THE ANEMO 4403 ANEMOMETER

TOOLS REQUIRED:

1 x Welding Machine – Qualified welder to do welding
1 x Hacksaw
2 x 17mm Spanners

PROCEDURE:

1. The wireless anemometer unit is pre-assembled with or without battery. If there is no battery fitted please see: Replacing 3.6V Battery.

2. The anemometer head unit will need to be mounted in the **best line of site** of the WS400 display unit at the furthest point possible ensuring that the “wind vanes” are

ABOVE the highest obstructive point i.e. on mobile cranes the unit should be mounted on the tip section above the level of the top of the boom so that even when the boom is at its highest point, the wind speed meter head is still above the boom head.

3. Find a suitable place to mount the anemometer. The mounting pole must be cut to the correct length, we recommend as short as possible to eliminate the possibility of the unit getting damaged or knocked off. The unit should be positioned correctly and have complete freedom of movement when swinging. The anemometer has a green nylon bush & washer where the pole slides through, this is fastened by using two M10 Nylock nuts & washers on either side of the spacer using the two 17mm spanners. Ensure the following:

    a. **DO NOT** tighten the nuts together too tightly as the anemometer will not be able to swing freely & self-level with the movement of the boom

    b. Ensure that the threaded bar is flush (inline) with the inner nut so that the threaded bar does not touch or interfere with the cable i.e., if the threaded bar protrudes from the nut it will damage the cable.

4. Once a suitable mounting place has been identified, weld the mounting foot to the crane's boom. The anemometer is isolated, and the bracket may be welded while the wind speed meter is attached to the pole. If the anemometer has been removed from the pole refit the anemometer as in point #3 above.

5. The anemometer and the display unit have been factory paired and therefore there is no need to "pair" the units. They will work together immediately (give at least 1 minute on brand new installations) once the installation has been completed, the power has been wired up to the display unit and the anemometer battery has been fitted.

REPLACING BATTERY

TOOLS REQUIRED:

1 x 5mm Flat screwdriver
1 x Size D 3.6V Lithium Battery (1.5V Battery can be used but the battery life will be considerably less)

PROCEDURE:

1. Loosen the four screws in the lid and remove the lid / cover of the IP 65 box located underneath the anemometer.

2. If there is no battery inside the battery compartment, then you will need to slide the battery into the compartment, making sure you have matched the positive pole of the battery to the positive side of the compartment, and the same for the negative pole. The battery is clearly marked on either side with a + (positive) and – (negative) and the compartment is also clearly marked with the same.

3. If you are replacing the battery, remove the old battery carefully and follow step #2.

4. Make sure all wires and the battery compartment are fitted neatly inside the box and close the box by tightening the four lid screws.

REPLACING THE ANEMOMOMETER - HEAD UNIT

TOOLS REQUIRED:

1 x 5mm Flat screwdriver
1 x 3mm Flat screwdriver
1 x 3mm Allen Key

PROCEDURE:

1. Loosen the four screws in the lid and remove the lid / cover of the IP 65 enclosure situated underneath the wind speed unit.

2. Loosen the M16 gland cap at the bottom of the enclosure, unscrewing the gland “cap” until it is hanging loose.

3. The cable must be carefully disconnected from the circuit board using the 3mm flat screwdriver. Insert the screwdriver into the flat side of the 2-way grey connector, this will loosen the wire from the connector. Repeat this for both wires.

4. Remove the wind speed “head unit” from the self-levelling bracket by removing the three M4 cap screws with the 3mm Allen Key.
5. Carefully pull the cable (unplugged in Step 3) through the M16 gland and the hole in the self-levelling bracket. Completely remove the anemometer “head unit” to be replaced.

6. Place the new anemometer “head unit” on top of the self-levelling bracket and fasten the wind speed unit to the bracket with the three M4 cap screws, tighten using the 3mm Allen Key making sure the cable is through the centre.

7. Gently feed the cable through the M16 gland from outside to inside the enclosure.

8. Plug the cables back into the grey 2-way connector on the board inside the IP65 box by inserting the 3mm flat screwdriver into the flat opening and inserting the crimped contact into the round opening. Standard wiring is yellow wire on the left and red wire on the right.

9. Tighten the cap of the M16 gland around the cable.

10. Close the lid of the IP65 enclosure and fasten the four screws in the lid.

SYSTEM USE

The Safe-Aid WS400 unit is designed with ease of operation in mind. The working screen (**Figure 3**) displays the following parameters:

- Current wind speed
- Wind speed limit (user adjustable maximum wind speed)
- The percentage utilisation – digital and bar graph
- Graphical representation of anemometer
- USB flash drive inserted
- Low Battery

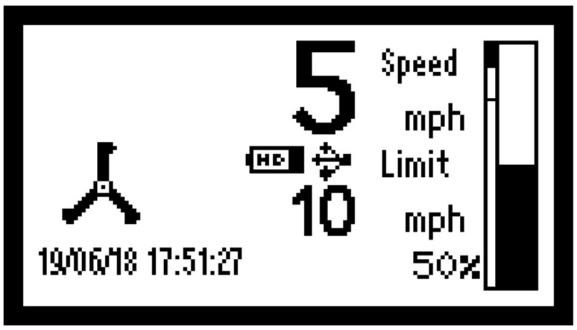

Figure 3

SYSTEM STARTUP

When powering up the WS400, the system runs through a complete set of internal system diagnostics to make sure all inputs and outputs are working correctly **(Figure 4**). The WS400 system goes into the working screen once all the relevant checks have been completed. No user entry is necessary when starting up.

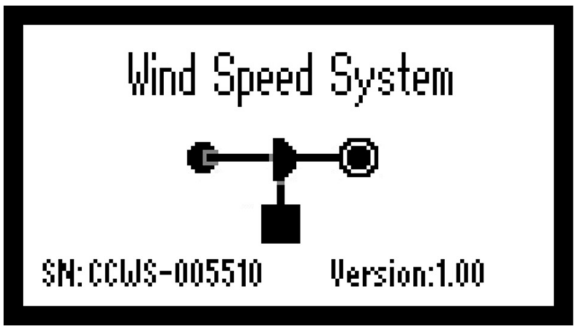

Figure 4

MESSAGES & UTILISATION

The wind speed unit measures wind speed between the following parameters.

UNIT OF MEASURE	MINIMUM WIND SPEED	MAXIMUM WIND SPEED
KNOTS	1.6	97.1
MILES PER HOUR	1.8	111.8
KILOMETERS PER HOUR	3.0	180.0
METERS PER SECOND	0.8	50

The WS400 display unit will only start displaying the wind speed once the **Minimum** wind speed has been reached.

Utilisation*:* Utilisation is the actual wind speed utilised against the wind speed limits. This is displayed graphically by the bar increasing incrementally as a percentage.

If the wind speed is equal to or greater than the Windspeed Intermediate Limit (**Figure 5**) the following will happen:

- **Intermediate Windspeed** will be displayed below the anemometer graphic replacing the date & time.
- The display buzzer will sound intermittently

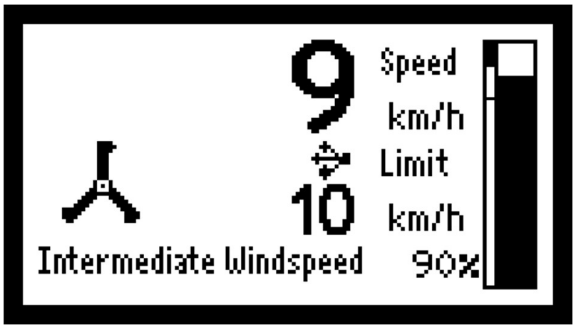

Figure 5

If the wind speed is equal to or greater than the Windspeed Upper Limit (**Figure 6**) the following will happen:

- **100% Windspeed** will be displayed below the anemometer graphic replacing the date & time.
- The display buzzer will sound permanently until an intermediate condition or lower is reached.

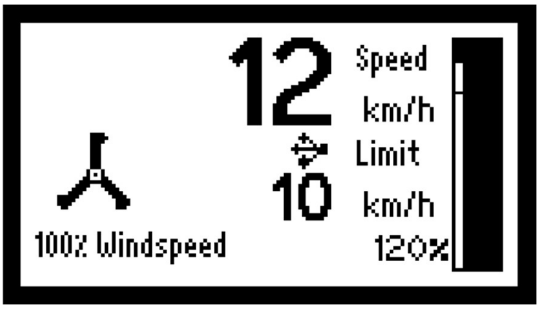

Figure 6

SETTINGS MENU

To enter the settings menu, hold the ZERO and TARE buttons simultaneously for 3 seconds. The screen will then enter the menu where the required selections can be made.

In the settings menu, the following functions can be changed or selected by using the MAX and MIN to highlight the required setting and pressing the ✓ to confirm:

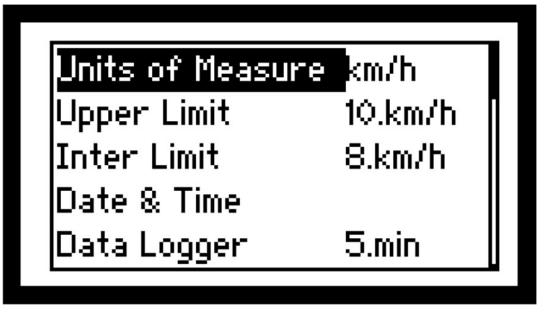

Figure 7

The following settings are found here:

- Units of Measure
- Upper Limit
- Inter Limit
- Date & Time
- Data Logger
- Screen Brightness
- Keypad Buzzer
- Test Relays
- Master Settings

Once the limits and correct units have been set press the X button to return to the working screen.

UNITS OF MEASURE

Highlight units of measure and select until the units required are displayed, the units will change sequentially as follows:

- **knots - Knots**
- **mph - Miles per hour**
- **km/h - Kilometers per hour**
- **m/s - Meters per second**

LIMITS

Once the correct units have been selected, the upper and intermediate limits must be set. The system has a pre-programmed conversion formula, so the limits can be set in one unit of measure but shown in another with no calculations needed by the operator. This can be done by just selecting the correct unit, inputting the desired limits, and then changing the units to the required units to be displayed.

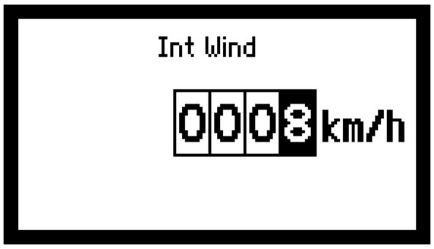

Figure 8

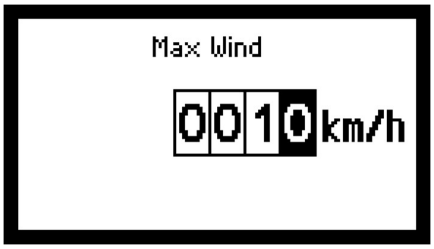

Figure 9

DATE & TIME

Highlight Date & Time then confirm, Use the change the required units as required.

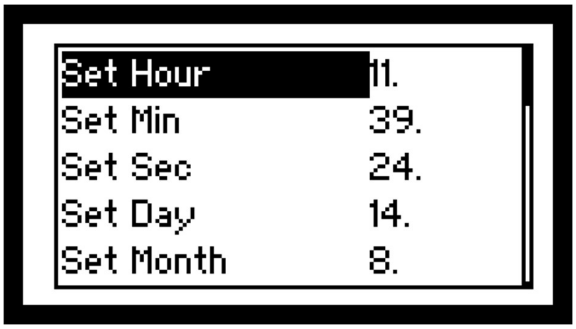

Figure 10

DATA LOGGER

For any logging of data to take place, a USB flash drive (memory stick) must be inserted into the WS400 display unit i.e., the USB symbol is displayed in the centre of the screen. The following pre-set data is then logged to the USB with the WS400 display units date and time stamp:

- Over Intermediate Limit
- Under Intermediate Limit
- Over Upper Limit
- Under Upper Limit
- Peak Speed
- Anemometer Low Battery
- Anemometer Battery Good
- Anemometer Not Connected
- Powerup / Anemometer Re-Connected
- Master Settings Entered
- Upper Limit Changed
- Intermediate Limit Changed
- Units of Measure Changed
- Date & Time Changed

There are two methods of logging used on the WS400 display unit:

- Continuous Logging – Time Interval time to be set to the required time (1-60 minutes)
- Log Limits – Time interval to be set to zero (0 minutes)

SCREEN BRIGHTNESS

Highlight screen brightness and select the required backlight brightness with 0 being off and 100 being on at its brightest.

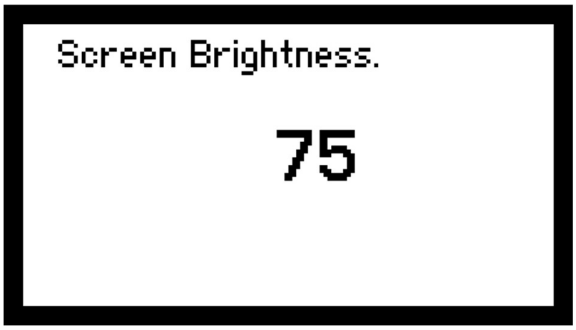

Figure 11

KEYPAD BUZZER

Select this to switch the buzzer on or off when the keypad buttons are pressed.

TEST RELAYS

Select to test the two relay outputs on the WS400 display board. Select on or off next to the relevant relay to switch the relay on and off.

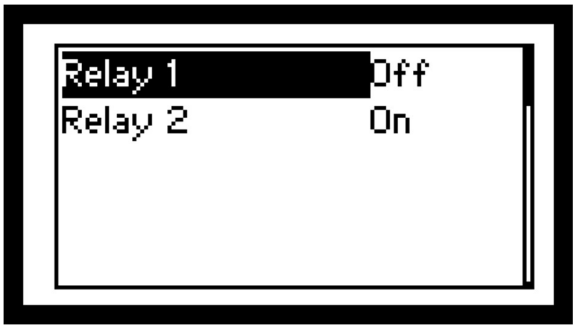

Figure 12

LOW BATTERY INDICATION

The WS400 display unit constantly monitors the battery in the anemometer and will display a low battery signal in the centre of the screen once the battery voltage is below the factory set voltage. This battery low warning will allow the operator time to do a battery change as per the REPLACING BATTERY procedure.

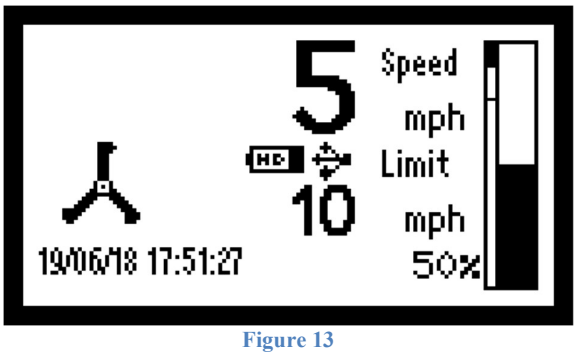

Figure 13

MASTER SETTINGS

These are advanced options and should only be done by or under the supervision of an authorized factory representative. These options have password protection, please contact your authorized distributor who will get a factory representative to help with these features. The following settings are found in here:

- Wireless Setup
  - Display
  - Anemometer
  - Reset Digi Module
- Save Settings – Factory Use
- Load Settings – Factory Use
- Reload Firmware – Factory Use

Figure 14

WIRELESS SETUP – WS400 DISPLAY UNIT

To make the system modular the Digi wireless module parameters can be changed if required i.e. if an anemometer head unit is changed, the WS400 display unit wireless parameters can be configured to suit. These parameters are found on the inside lid of the anemometer wireless board/battery compartment or can be accessed from the factory serial number register. To enter these parameters:

- Select **Wireless Setup**
- Select **Display**

Figure 15

Now begin entering the values by selecting the required value and entering the correct parameters

- Channel – Entered as per the anemometer sticker

- PanID – Always set to **1111**
- Dest(DL) – Source address (MY) of anemometer head unit
- Source(MY) – Destination Address (DL) of anemometer head unit

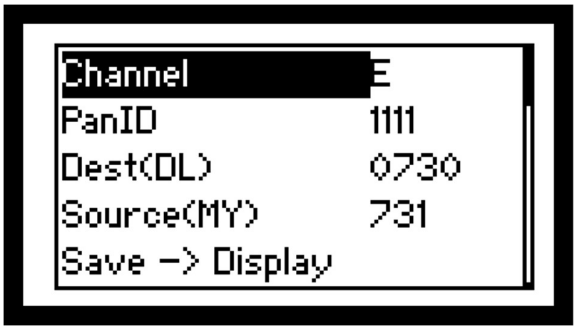

Figure 16

Once all the parameters have been set, select **Save → Display** and the values will be saved.

Windspeed NC will be shown on the working screen below the anemometer graphic, replacing the date & time if the wireless unit is not connected and working correctly.

WIRELESS SETUP – ANEMOMETER HEAD UNIT

This is for authorized factory technicians only.

RESET DIGI MODULE

This is for authorized factory technicians only.

DATA LOGGER SOFTWARE SETUP FOR PC

All the data stored on the USB flash drive can be downloaded and stored on to a PC. All data is stored in the .CSV file format (comma separated values) and can therefore be used with any software program compatible with CSV e.g., Excel, Notepad, or data base programs.