

**National Marine Electronics Association  
(NMEA) wind display compatible**

# Manual

## Synchrotac SYN-706 series

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Status: Final

Confidentiality: Not confidential

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## Document history

The Observator range is in continuous development and so specifications may be subject to change without prior notice. When in doubt about the accuracy of this document, contact the Observator Group.

### Reference documents

| Type of document / tool | Product type and name (incl. url) |
|-------------------------|-----------------------------------|
| Manual                  | <a href="#">SYN-706 series</a>    |

### Revision history

| Date       | Amendments  | Company, position                         |
|------------|---|---|
| 2017-07-31 | Initial document creation                               | Observator Australia, Document Controller |
| 2017-10-24 | Warranty conditions                                     | Observator Australia, Document Controller |
| 2018-04-09 | Introduced document control                             | Observator Australia, Document Controller |
| 2019-03-16 | Included vane assembly safety instructions              | Observator Australia, Document Controller |
| 2019-07-15 | Quality review  | Observator Group, Communication Officer   |
| 2020-01-30 | Updated document format                                 | Observator Australia, Document Controller |
| 2020-03-03 | Remove SYN-724 model + update installation instructions | Observator Australia, Document Controller |

### Procedure sign-off:

| Date       | Company, position                         | Status   |
|------------|---|----------|
| 2018-04-09 | Observator Australia, Document Controller | Finished |
| 2019-12-06 | Observator Australia, Managing Director   | Approved |
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### Distribution list

| Date | Company, position |
|------|-------------------|
|      |                   |

## Summary

The Synchrotac-706 series heavy duty wind speed and direction transmitter NMEA is compatible with wind display technology.

The Synchrotac-706 series heavy duty wind speed and direction transmitters are designed for long, trouble free life under severe climatic conditions. They are solidly constructed from naval bronze, brass, stainless steel and other corrosion resistant materials. Bearings are low friction stainless steel for a low starting threshold.

The instrument is sealed against dust, moisture and vermin ingress and mounts directly on a  $\frac{3}{4}$  inch (speed only) or  $1\frac{1}{2}$  inch (speed & direction) male British Standard Pipe (BSP) thread. Special bearing lubricants ensure reliable operation over the temperature range and, under normal conditions, should give maintenance free operation in excess of 10 years.

Designed for meteorological applications where accuracy, durability and long-term reliability are required even in severe climatic conditions. The Synchrotac has a long history of reliable service in very aggressive environments such as in coastal tropical cyclone areas and oil rigs.

Three anemometer models and two wind direction models are available in the Synchrotac-706 series. The anemometer models available are the SYN-732 (poly-phase linear generator); the SYN-734 (isolated switch contact closure); and the SYN-736 (for opto-electronic pulse output). The wind direction model is the 706 unit - 360° precision potentiometer.

The wind speed section may be any one of three user selected technologies. The type SYN-732 is a ten pole Alternating Current (AC) generator, the type SYN-734 employs magnetically actuated reed switch(es) and the 736 is an opto-electronic transducer.

Wind direction is also ordered in one of two different configurations. The type SYN-706 is a potentiometric transducer.



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## 1 Applications

Typical use of the SYN-706 device include applications such as:

1. Severe wind
2. Severe temperature
3. Severe dust

SYN-706 products are also ideal for applications where the conditions are severe.



## 2 Safety



For correct functioning of the SYN-706, the sensor must be installed according to the installation instructions.



Always screw the vane assembly vertically and hold it from the tip.



Always install the SYN-706 to a 35m Deutsches Institut für Normung (DIN) rail mounting foot.



After end of life, please dispose this product according to your local regulations or return it to the manufacturer.

### 3 Specifications

The anemometer section may be purchased separately for wind speed only applications.

#### Wind direction transmitter section



- Vane length: 457mm (18").
- Turning circle diameter: 914mm (36").
- Body diameter: 109mm (4.25").
- Overall height: 329mm (13").
- Mass of vane assembly: 1.1kg (2.4lbs).
- Overall weight: 9kg (19.8lbs).
- Mounting: 1 1/2" BSP female thread.
- Starting threshold: <0.7m/sec.
- Mechanical travel: 360° (continuous).
- Operating temperature: -40°C to +60°C.
- Transducer: 1 kΩ precision potentiometer.
- Electrical travel: Better than 354°.

#### Wind speed transmitter section



- Cup diameter: 127mm (5") internal.
- Turning circle diameter: 457mm (18").
- Body diameter: 102mm (4").
- Overall height: 239mm (9.4").
- Mass of cup set: 0.95kg (2.1lbs).
- Overall weight: 3kg (6.6lbs).
- Mounting: 3/4" BSP female thread.
- Maximum wind speed: >100m/sec (>200 knots).
- Accuracy: better than ±3% above 5m/sec.
- Transfer coefficient: 0.35 revolutions per minute (RPM).  
Default is 5 pulses per revolution.

### Specifications

|              |   |
|--------------|---|
| Power supply | 9-26V Direct Current (DC); up to 80mA.<br>Green Light-Emitting Diode (LED) to indicate power available. |
|--------------|---|

### Wind direction

|                                |   |
|--------------------------------|---|
| Wind direction input           | 0V reference, wiper connections for 1K potentiometer as used in SYN-706.  |
| Wind direction resolution      | 1 degree (except in dead band areas).   |
| Wind direction accuracy        | ±2 degrees (for a potentiometer with 5-degree dead band).   |
| Wind direction error detection | Senses open circuit condition on cable connecting to wind direction sensor on 0V, reference or wiper wires.<br>Reports warning in serial output by inserting '999' in the wind direction field.<br>Reports warning on status LED with a single red flash once per second.<br>Wind direction errors will be detected within 2 seconds of a wire break. |
| Wind direction notes           | Includes dead band sensing – unit will detect wiper in dead band region, and apply a suitable output reading for the dead band. Wiper of sensing potentiometer must be pulled to 0V at anemometer with a 100k resistor. This is done in the SYN-706 direction sensing canister.   |

### Wind speed

|                            |  |
|----------------------------|--|
| Wind speed Input           | Via pulse detection of anemometer signal.<br>Sensitivity 0.15V.<br>Pulse frequency 1Hz to 1kHz.  |
| Wind speed resolution      | ±1 knot.   |
| Wind speed accuracy        | ±1 knot.   |
| Wind speed error detection | Senses open circuit condition on cable connecting to anemometer.<br>Reports warning in serial output by inserting '999' in the wind speed field.<br>Reports warning on status LED with two red flashes per second.<br>Wind speed errors will be detected within 5 seconds of a wire break. |

### Output

|                               |   |
|-------------------------------|---|
| Serial output                 | RS422, 4800 bauds; 8 data bits; no parity; 1 stop bit (free-flow or polled mode).   |
| User adjustable parameters    | <ol style="list-style-type: none"> <li>1. Direction deviation</li> <li>2. Wind speed units (knots standard)</li> <li>3. Sensor ID</li> <li>4. Output type (Australian Bureau of Meteorology (BOM) A2669 standard; NMEA optional)</li> <li>5. Direction pot calibration</li> </ol> |
| Factory adjustable parameters | <ol style="list-style-type: none"> <li>1. Analog input selection (SYN-706 standard)</li> <li>2. Anemometer pulses per revolution</li> <li>3. Anemometer transfer coefficient</li> <li>4. Direction of dead band</li> </ol>  |



Safety note:

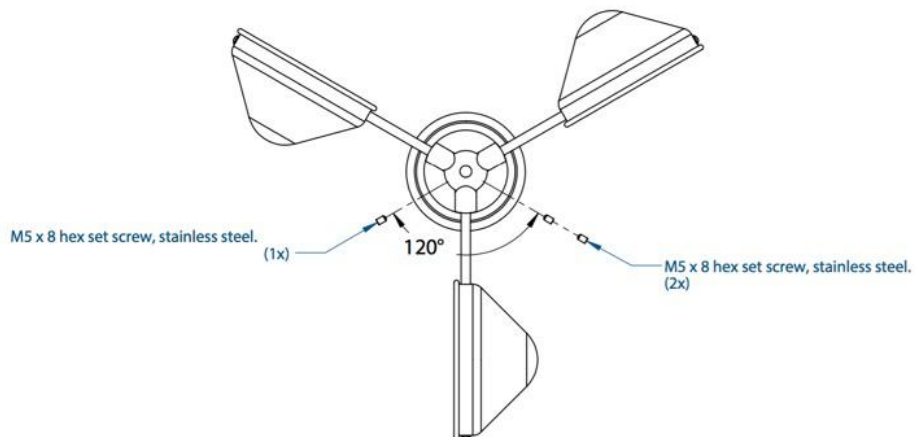
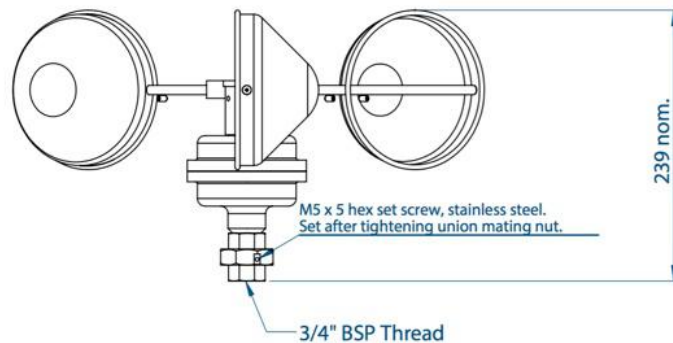
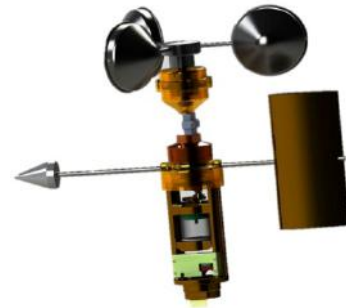
When securing the cup set onto the anemometer shaft, fasten the first M5 set screw seats into the circular depression on the flat of the anemometer shaft. Fasten tightly. The second M5 set screw should be screwed in with a little (breakable) thread adhesive applied and when properly fastened should be just below the surface of the cup set hub.

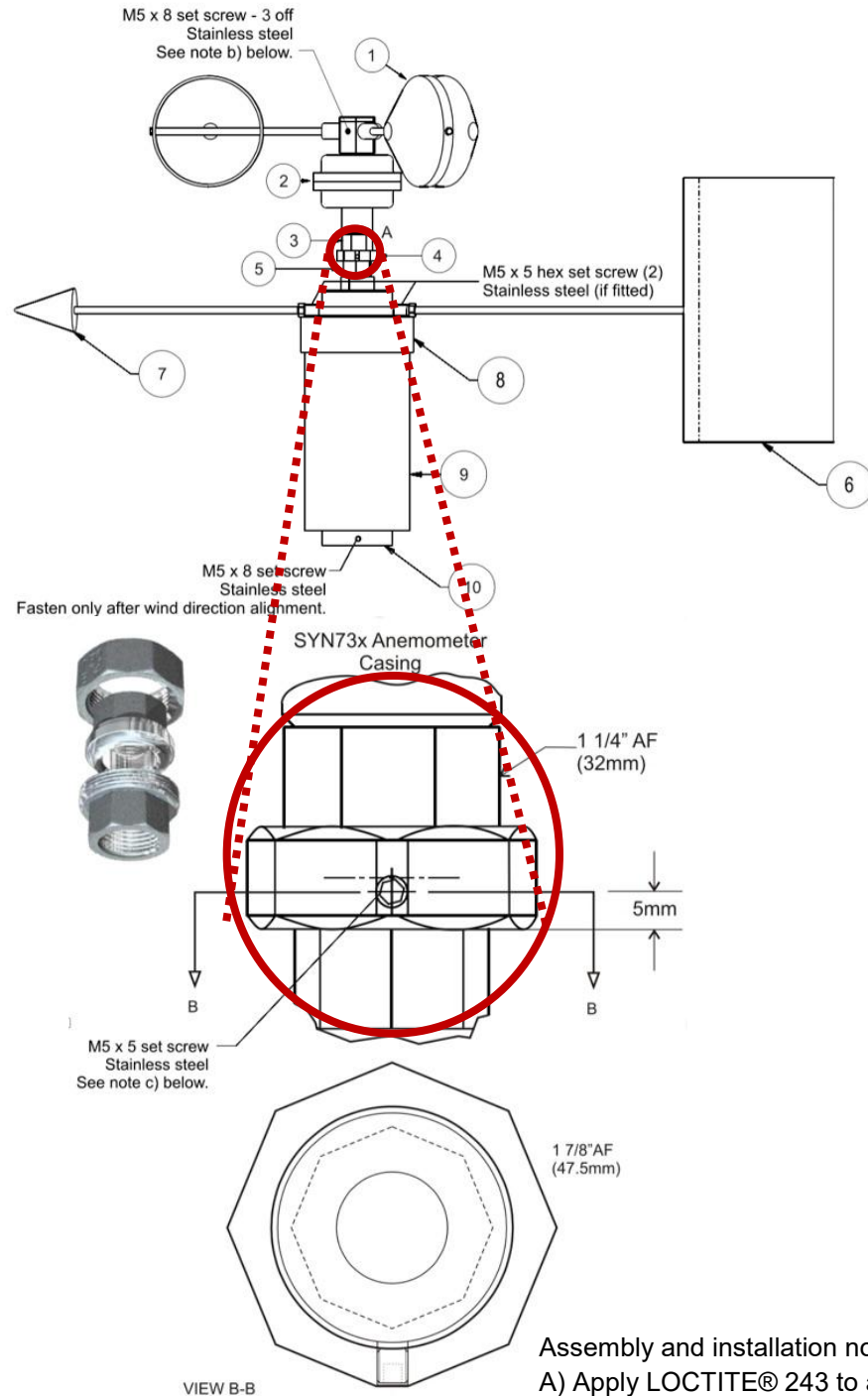
Additionally, a third M5 set screw is then fastened at 120° to the previous set screws.

The 3/4" BSP mounting union at the base of the anemometer should have thread adhesive applied to all threads and then fastened tightly.

Fasten the M5 set screw in the union mating nut only after the nut has been tightened in place. A little (breakable) thread adhesive is recommended on the thread of the M5 set screw.

| Dimensions |                            |
|------------|----------------------------|
| Dimensions | 82mm X 44mm X 19mm         |
| Weight     | 200g                       |
| Mounting   | 35m DIN rail mounting foot |





Main external parts listing:





1. Cup set.
2. Anemometer casing.
3. Upper connection union.
4. Union mating nut.
5. Lower connection union.
6. Vane assembly.
7. Pointer/counterweight assembly.
8. Wind direction rotating hub.
9. Wind direction jacket.
10. Wind direction main casting.

Assembly and installation notes:

- A) Apply LOCTITE® 243 to all screw threads when assembling or installing.
- B) When properly installed the top set screw retaining the cup set (1) will be below the surface of the cup set hub (*Refer to "Safety note"*).
- C) The union mating nut (4) must be tightened to a torque setting of 20N·m before applying and tightening its retaining set screw.
- D) Refer to the Synchrotac-706 series datasheet and installation instructions version 4.5 or later for more detail.

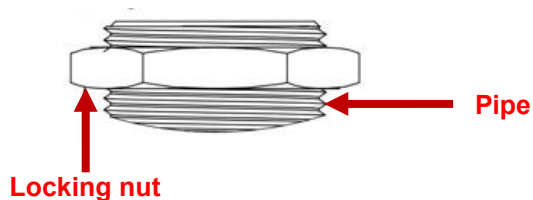
## 4 What you will find in the box

When the product is delivered, this is what you will find in the box:

| Items found in the box         |  |
|--------------------------------|--|
| Wind direction device          |     |
| Pointer/counterweight assembly |    |
| Vane assembly                  |  |
| Cup set                        |  |

## 5 Installation

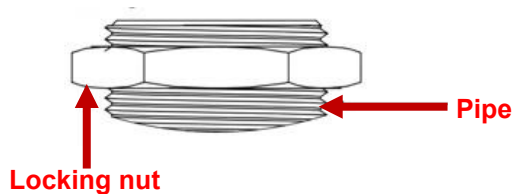
1. To install the Synchrotac-706 series for the first time, screw on locking nut before fitting anemometer to the pipe.



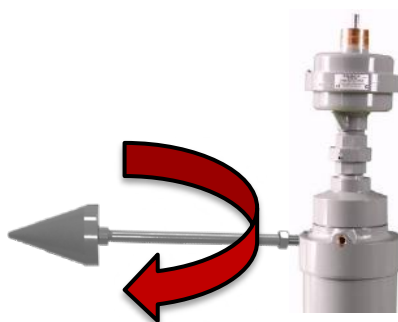
2. Screw the wind direction main casting to the 35m DIN rail mounting foot.



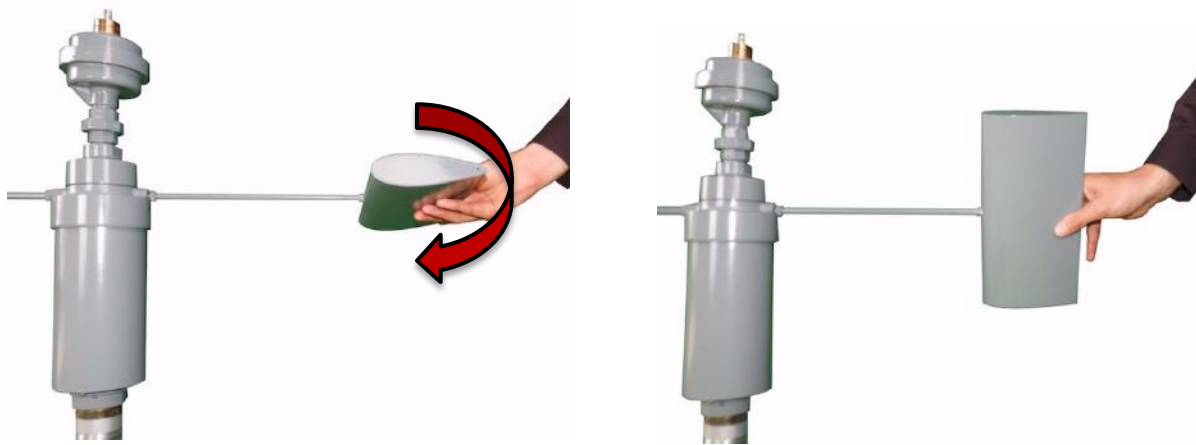
3. Tighten locking nut against the wind direction main casting once the anemometer base has been fitted and aligned.



4. Screw the pointer/counterweight assembly in the smallest hole.

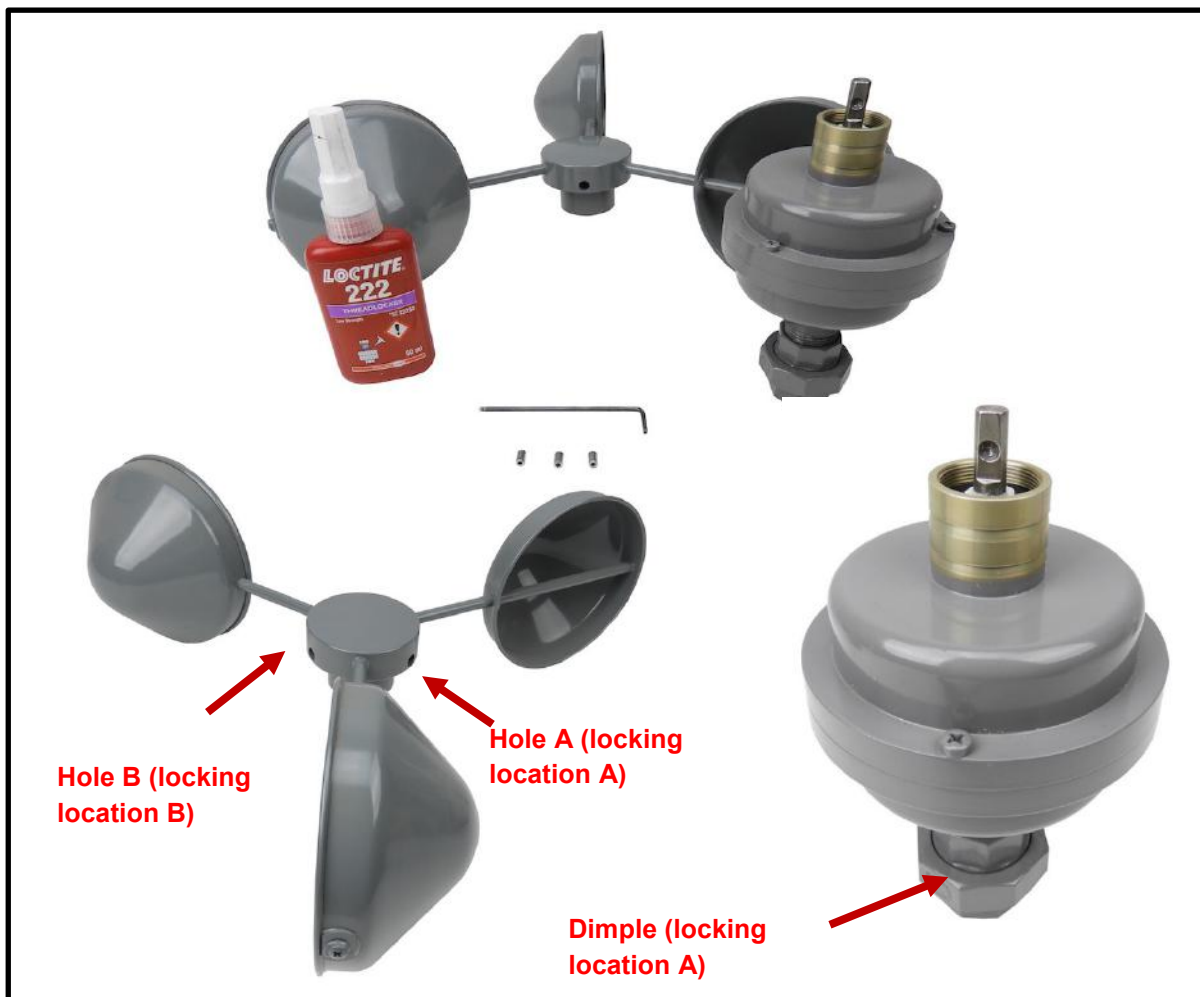


5. Hold the vane assembly from the tip and screw it to the biggest hole as shown on the following picture. the position of the vane assembly should be vertical.



6. Install the cup set on top of the anemometer casing:

- a) The cup set is shipped with 3 grub screws to be placed at 2 locking screw locations.



- b) Put one grub locking screw in line with the round hole upfront with hole A on the shaft.



- c) Screw until you see the screw slightly come through (just enough to spot the hole).



- d). Turn backwards a little bit until it disappears.



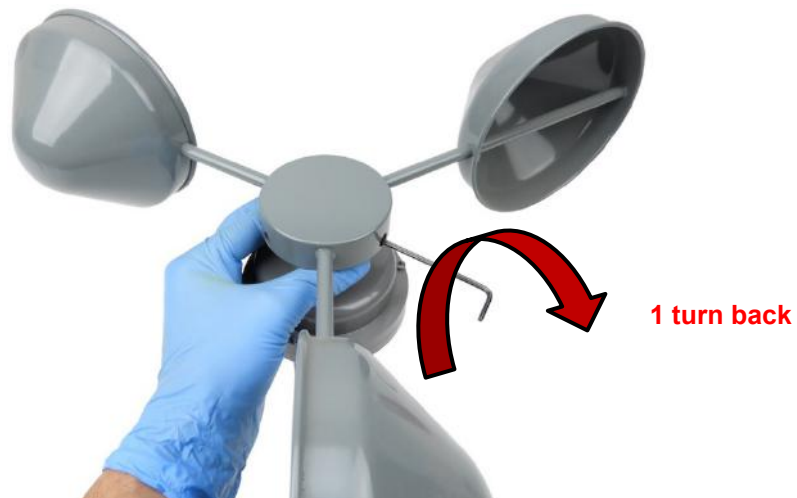
- e) Align hole A with the hole on the shaft.



- f). Screw the first grub screw all the way.



- g) Back it off 1 turn only.



- h) Lift the cup set, it should not move and still be engaged in the shaft. If it engages to the dimple, the shaft should not come off.



- i) If it disengages, start over and make sure the screw is aligned with the dimple.





- j) Once you are comfortable that the screw is properly engaged, tighten the first screw.



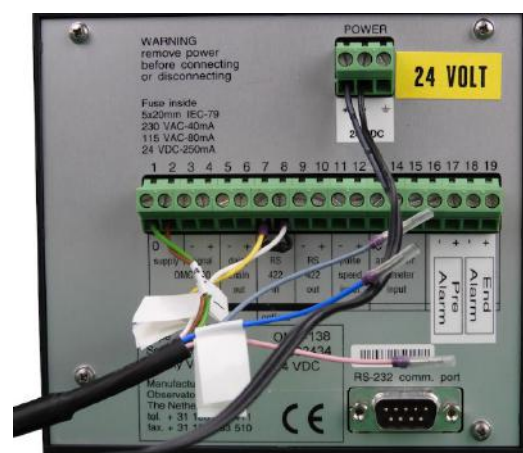
- k) The second locking screw is a back-up to tighten more. Apply LOCTITE® onto the second screw (e.g. LOCTITE® 222 or other mechanical adhesive) and tighten the second screw behind the first screw.



- l) Apply LOCTITE® onto the third screw (e.g. LOCTITE® 222 or other mechanical adhesive) and tighten the third screw on the hole B located 120-degree left.



7. NMEA model only: Connect the Synchrotac to the back of the wind display. Make sure that the pointer faces the North. Use the RS232 communication and lock the North direction according to the wind display specification. Set the NMEA standard parameters, such as the unit into knots or meter per second.



Note: You can build a network of sensors using NMEA communication.

## 6 Maintenance & calibration

Servicing of the sensor requires to change the cartridge on a regular basis and to perform factory calibration using the NMEA module.

- **Read more:** Consult **Chapter 10 Appendix B: Section 10.6: “Factory calibrations (FACTCAL)”**.



## 7 Application note

### 7.1 Positioning of wind speed instruments

The World Meteorological Organization (WMO) states that an anemometer for the purpose of measuring surface winds should be mounted ten meters above the ground as a standard.

Ideally, measurements should be made on level, open terrain, but since such conditions rarely exist, certain guide-lines may be followed should obstructions or other problems related to exposure exist.

### 7.2 Locating instruments on or near structures

Generally accepted guide-lines for locating wind systems around an obstruction while keeping instruments in the ambient airflow are as follows:

1. For structures up to ten meters' high.
  - Locate instrument, generally upwind of a structure, at a distance away equal to the structure's height.
  - Locate instrument on top of the structure at a height of the structure above the structure.
  - Locate instrument a distance generally downwind of structure equal to 5-10 times the structure height.
  
2. For structures in excess of ten meters' high.
  - Placing instruments on top of very small structures presents some difficulties. Whenever possible it is best to erect a tower to clear any obstructions. In the case of a building where a tower may not be practical, an alternative is to place the instrument on a corner of the building that is generally upwind, or the corner, which is exposed to the frequency of the wind.
  - Before making a permanent installation, monitor a small flag at the end of a pole mounted in various locations on the building, to assist in determining the location which is most representative.
  
  - In a flat open rural area an installation of two meters height may be sufficient.

## 8 Electrical conformity

### EC Declaration of Conformity according to Council Directive 89/336/EEC

We, Observator Instruments Pty. Ltd., declare under our sole responsibility that the product:

SYNCHROTAC-706-series wind instruments,

SYN-732, SYN-734V1, SYN-734V2, SYN-736  
SYN-706/732, SYN-706/734V1, SYN-706/734V2,  
SYN-706/736, SYN-732, SYN-734V1,  
SYN-734V2, SYN-736

Manufactured by:

Observator Instruments Pty. Ltd.

To which this declaration relates, are in conformity with the protection requirements of Council Directives 89/336/EEC on the approximation of the laws relating to electromagnetic compatibility.

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

Emissions: EN50081-1 USING EN55022 CLASS B.  
Immunity: EN50082-1 USING IEC61000-4-2, IEC61000-4-3,  
IEC61000-4-4, AND IEC61000-4-6.

Signed by:

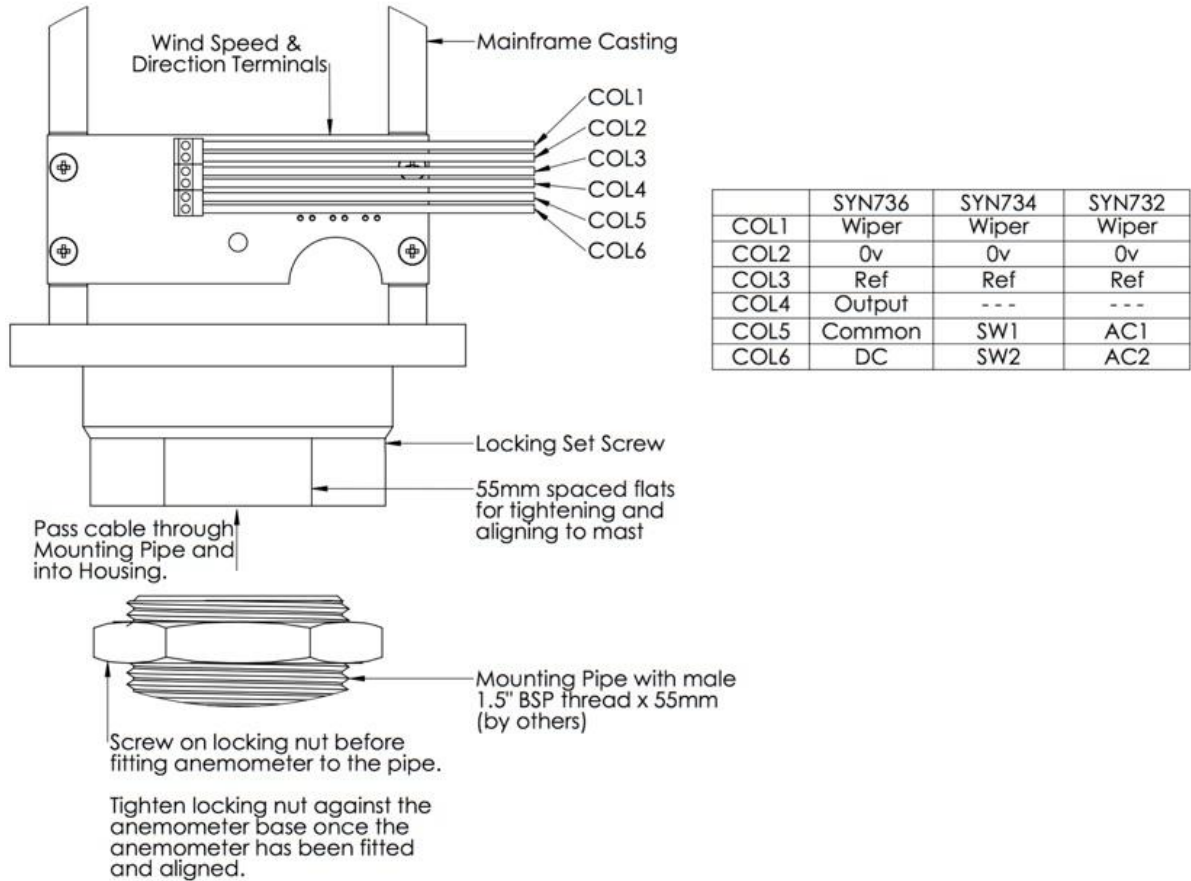


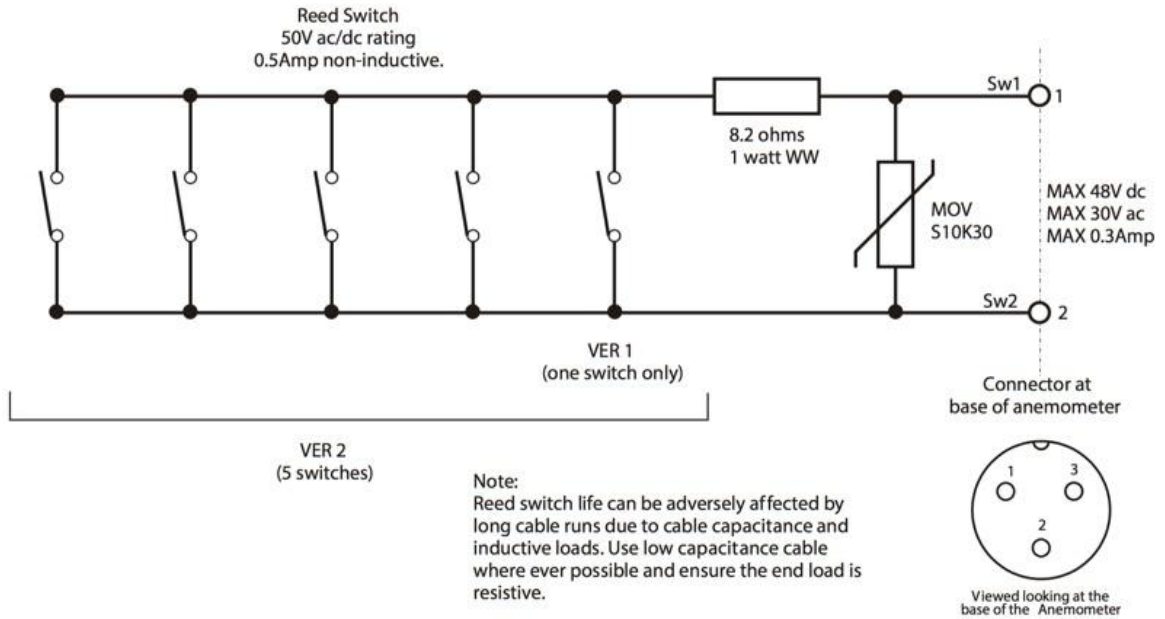
Dana Galbraith – Managing Director

Date of Issue: 1 December 2002  
Place of Issue: Observator Instrument Pty. Ltd.  
8-10 Keith Campbell Court, PO Box 9039  
Scoresby, VIC 3179 AUSTRALIA



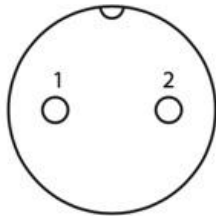
## 9 Appendix A: Cabling consideration



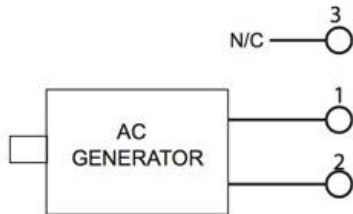
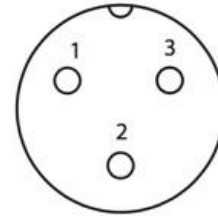


## SYNCHROTAC 706 SERIES CONNECTOR PIN ASSIGNMENT

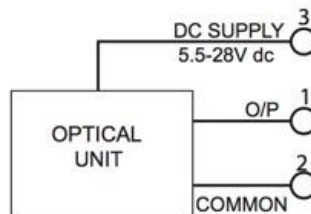
### 73x ANEMOMETERS



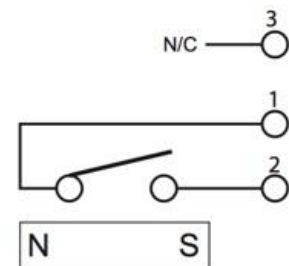
Viewed looking at the  
base of the Anemometer



SYN732

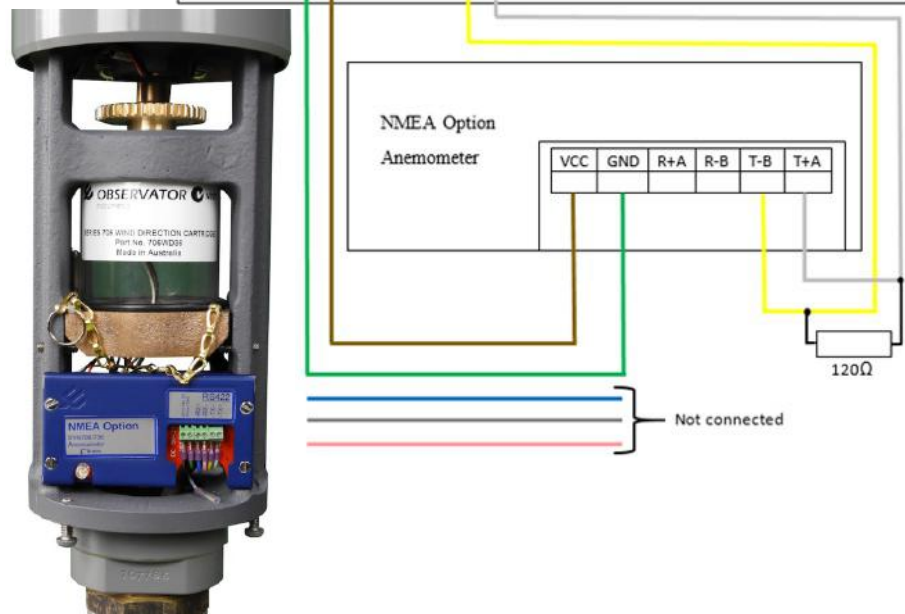
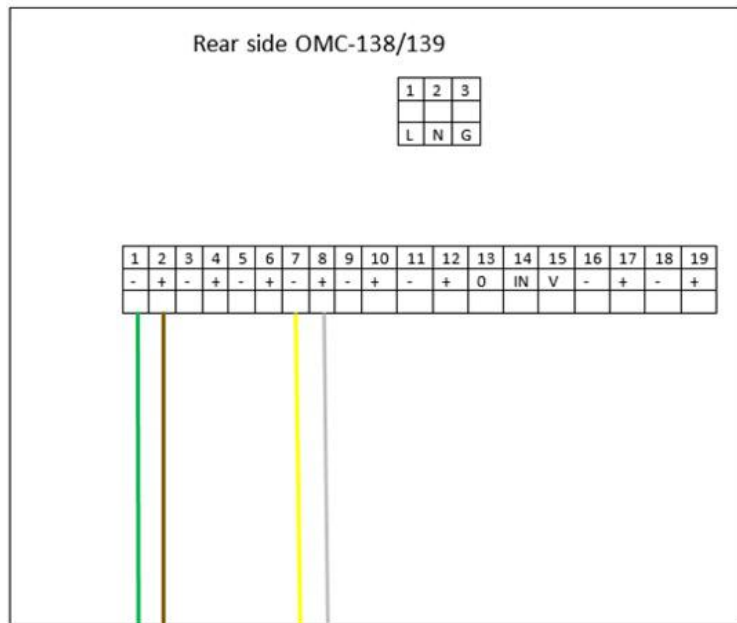


SYN736



SYN734V1 (1 switch)  
SYN734V2 (5 switches)

The NMEA output option in RS422 is compatible with all of the Observator Instruments displays including OMC-140 and OMC-138/9 and SYN-96dx.

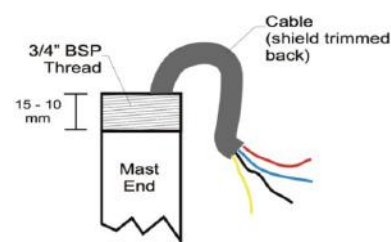




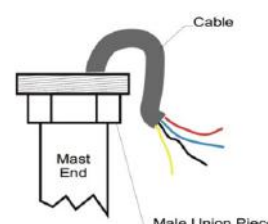
## 9.1 Anemometer section only (SYN-732/734/736)

Follow these instructions if you want to install a full instrument (wind speed only):

1. Prepare a mast to the appropriate height, with at least 250mm of pipe at top threaded to 3/4" BSP. The male thread section must be at least 20mm long. Feed a suitable cable\* with approximately 250mm protruding from the top of the mast pipe. Ensure that the mast pipe is properly earthed.
2. Remove the anemometer body and cup set assembly from its packaging. Be careful not to damage the cup set assembly.
3. Remove the mating female connector and put aside. Separate the bottom half of the 3/4" union at the base of the anemometer body and tightly fit it to the mast pipe, using a thread adhesive. Ensure the cable is threaded through the union base.
4. The mating female connector should be properly terminated to the cable protruding from the top of the mast pipe.
5. Mate the female connector into the plug at the base of the anemometer body. Care should be taken to ensure the connectors are properly mated. The pins are numbered and keyed.
6. Apply some (breakable) thread adhesive to the male union thread. Place the anemometer body onto its mating union half on the mast and fasten the union nut tightly. Fasten the M5 hex set screw in the union nut.
7. Fit the cup set assembly to the anemometer shaft. The cup set hub is supplied with two M5 set screws. Ensure the set screw in the cup set hub is in line with the flat on the anemometer shaft and seated in the circular depression on the shaft. Firmly tighten the first set screw. Apply a little (breakable) thread adhesive to the thread of the second setscrew, insert behind the first set screw and tighten. If the cup hub and the shaft are properly aligned, the end of the second grub screw will be just below the surface of the cup hub.
8. Test the anemometer for proper performance. Ensure there is a good earth contact between the anemometer body and the mast pipe.
9. If properly installed, the Synchrotac-706 series wind speed transmitter should require no maintenance for many years.



Prepare mast end and cable



Fit male union piece

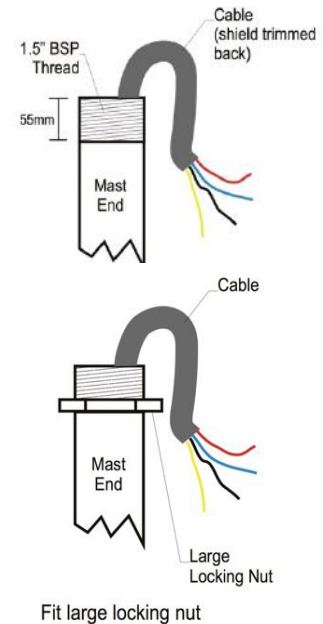
\*The characteristics of a suitable cable is dependent on the instrument used and the application environment. As a minimum the cable should contain at least 2 cores for the SYN-732 and 734, 3 cores for the SYN-736, 5 cores for the SYN-706/732 and SYN-706/734 and 6 cores for the SYN-706/736 although a few spare cores is recommended. The conductor core should be overall shielded with the shield terminated at the logger/indicator end only. The cable should be a low capacitive type particularly for installations containing the SYN-734 anemometer version. High cable capacitance can shorten the life of the reed switch units in the SYN-734 due to the high current discharge it may cause each time the switch closes - a limiting resistor is installed in the SYN-734 to assist in the protection of the reed switches contained therein.

**Safety note:** To ensure the instrument remains properly installed, make sure a suitable and quality thread adhesive is used where stipulated. Failure to do so may result in the instrument or one of its components working loose under conditions of prolonged thermal or mechanical stress.

## 9.2 Full instrument cabling (SYN-7yy/73x)

Follow these instructions if you want to install a full instrument (wind direction + wind speed)

1. Prepare a mast to the appropriate height, with at least 250mm of pipe at top threaded to 1½" BSP. The male thread section must be at least 55mm long. Screw the supplied large brass locking nut onto the pipe, thread to the bottom of the thread. Feed a suitable cable\* with approximately 250mm protruding from the top of the mast pipe. Ensure that the mast pipe is properly earthed.
2. Remove the Synchrotac-706 series wind speed and direction transmitter from its packaging being careful not to damage the cup or vane assemblies. Remove the weather-proof 108mm diameter cover from the wind direction section by loosening the 3 screws located on its underside. Turn the cover so that the screw heads pass through the enlarged section of the slotted holes in the cover's flange.
3. Place the wind direction cover over and through the mast pipe so that the flange is at the bottom and temporarily tie it to the mast until the unit is installed and wiring completed.
4. Thread the cable up through the BSP female thread fitting at the base of the wind direction unit. Apply some slow setting thread adhesive to the mast thread and screw the instrument onto the mast. Use caution as the instrument is heavy.
5. Bare (or fix male 6.4mm spade connectors to) the necessary number of conductors from the cable and connect to the terminals at the bottom of the wind direction cartridge keeping note of the colours. Connection can usually be done using a right-angled screwdriver; if this is not possible, remove the cartridge for connection as follows:



**Note:** carefully before the removal of the wind direction cartridge, position all parts in relation to each other. Slacken the 4 set screws in the main frame that holds the direction cartridge in position, but only far enough to allow the clamp and direction cartridge to be lowered and removed. Place the direction cartridge clamp over the conductors (tapered sides to the bottom). Connect the conductors and prepare to re-install the cartridge in the same position as before. First note that both the gear and the direction cartridge have a 3mm hole in the top, and the clamp has a pin attached to it by means of wire. Rotate the gear on top of the wind direction cartridge so that it lines up with the hole in the top of the unit. Place the cartridge back in the frame of the unit, making sure that the rubber ring is in position at the bottom of the cartridge. The holes in the top of the cartridge and the gear should be opposite the small gear in the top of the wind direction unit. With the balance weight of the vane in the same position prior to cartridge removal, engage the gears. Place the cartridge clamp in position and tighten the 4 locking set screws in position so that the rubber ring just compresses. Ensure the cartridge is held firmly and will not move.

6. Place the supplied 3mm right-angled pin in the hole in the cartridge gear. To enable this to be done you will note that to the side of a screw over which the conductors from the wind speed section is placed, there is a machined section to allow the pin to be installed. Turn the wind direction vane until the pin locates in the hole in the top cartridge. This now locks the unit in the North position of the cartridge. Tighten the wind direction unit on the mast (using the 55mm spaced flats on the bottom mounting hub) and adjust until the vane balance weight points to the North. Lock the unit in position using the set screw in the threaded portion at the base of the unit. Remove the 3mm pin so that the vane is free to rotate and let the pin hang down inside the mounting pipe, making sure that it does not touch the connection terminals. Screw up the brass locking nut and firmly tighten against the anemometer housing – ensure the housing does not rotate.
7. Fasten the locking set screw in the base of the wind direction casting onto the mast pipe thread.
8. Connect the appropriate conductors to the wind speed terminal strip mounted near the bottom of the main frame. Ensure there is a good earth contact between the instrument body and the mast pipe.
9. Replace the weatherproof cover on the unit and tighten the 3 screws. Rotate the vane and make sure it moves freely.
10. Fit the cup set assembly to the anemometer shaft. The cup set hub is supplied with two M5 set screws. Make sure the set screw in the cup set hub is in line with the flat on the anemometer shaft and seated in the circular depression on the shaft. Firmly tighten the first set screw. Screw in the second set screw and tighten. If the cup hub and the shaft are properly aligned, the end of the second grub screw will be just below the surface of the cup hub. Apply a little thread adhesive to the thread of the second set screw.
11. Test the unit for proper performance. Ensure there is a good earth contact between the instrument body and the mast pipe.
12. If properly installed, the Synchrotac-706 series wind speed and direction transmitter should require no maintenance for many years.

\*The characteristics of a suitable cable is dependent on the instrument used and the application environment. As a minimum, the cable should contain at least 2 cores for the SYN-732 and 734, 3 cores for the SYN-736, 5 cores for the SYN-706/732 and SYN-706/734 and 6 cores for the SYN-706/736 although a few spare cores is recommended. The conductor core should be overall shielded with the shield terminated at the logger/indicator end only. The cable should be a low capacitive type particularly for installations containing the SYN-734 anemometer version. High cable capacitance can shorten the life of the reed switch units in the SYN-734 due to the high current discharge it may cause each time the switch closes - a limiting resistor is installed in the SYN-734 to assist in the protection of the reed switches contained therein.

**Safety Note:** To ensure the instrument remains properly installed in service, make sure a suitable and quality thread adhesive is used where stipulated. Failure to do so may result in the instrument or one of its components working loose under conditions of prolonged thermal or mechanical stress.

## 10 Appendix B: NMEA calibration

### 10.1 Access to the NMEA module

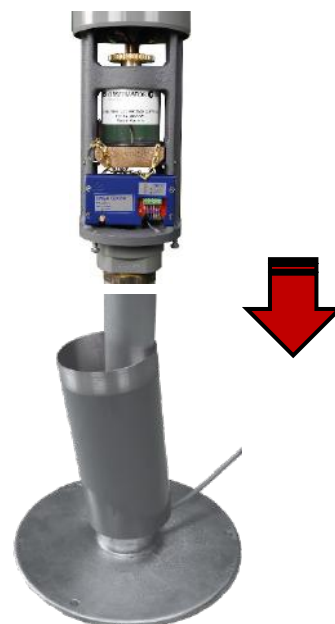
1. Turn slightly the wind direction jacket until the screw head faces the cover hole.



2. Carefully lower the wind direction jacket to access to the NMEA module.



3. To open the wind direction sensor, slightly unscrew the three screws.



Note: To screw the cover back on, repeat step 3 to step 1 on the opposite direction.

## 10.2 NMEA configuration

| NMEA          |   |
|---------------|---|
| Serial format | <p>BOM A2669 output</p> <p>SITE,Dsam,Ssam,MPS,CS&lt;CR&gt;&lt;LF&gt; - is the header sent every 1 minute</p> <p>SITE,Dsam,Ssam,MPS,CS&lt;CR&gt;&lt;LF&gt; - is the data format sent every 1 second, with fields as described below:</p> <p>&lt;SITE&gt; = 4 character site ID code</p> <p>&lt;Dsam&gt; = [ nnn   '999' ] - Wind Direction sample in degrees true</p> <p>&lt;Ssam&gt; = [ nnn   '999' ] - Wind Speed sample in knots</p> <p>&lt;MPS&gt; := nn   'MPS'- Message repetition period in whole seconds (usually 01)</p> <p>&lt;CS&gt; := nnn   'CS'- message check sum - - check sum code derived from the sum of the ASCII codes of all characters in the message excluding the &lt;check-sum&gt; and &lt;eoln&gt; (nnn is equal to the three least significant digits of the ASCII sum)</p> |

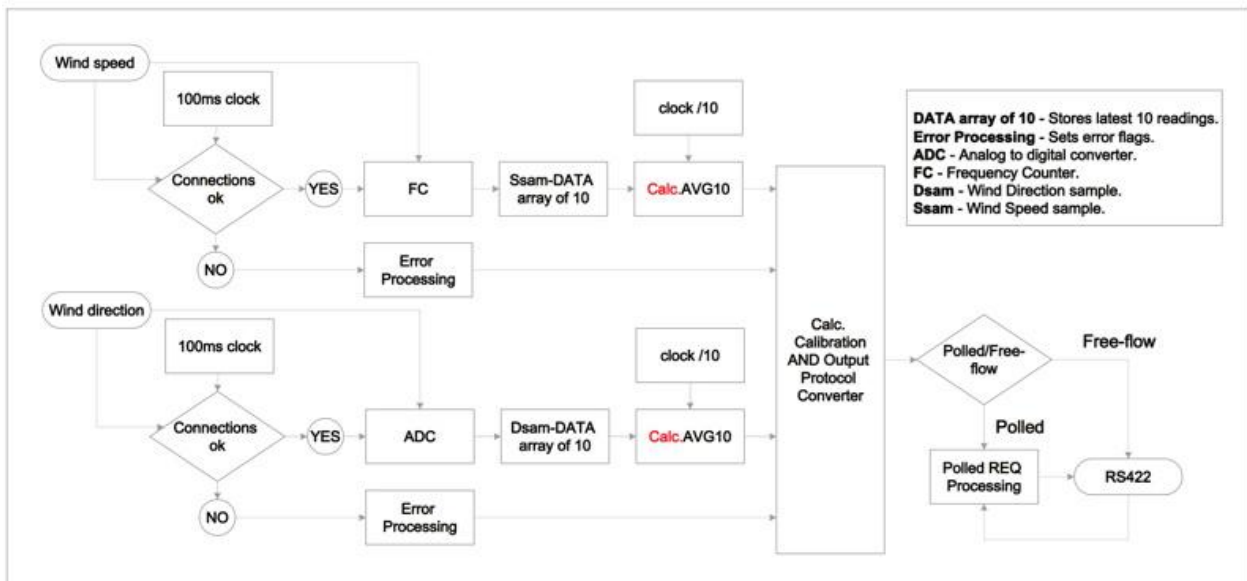


Figure 10.A: System operation in sensing wind speed and direction

## 10.3 Access to command mode

To access the command mode, type:

Hyper terminal command

```
$ CMD + Enter # To access command functionality  
$ # or  
$ CMDCR # Send CMDCR through modem
```

NMEA module replies.

Hyper terminal prompt

Enter user command (Q & press "Enter" to quit):

**PARAM** & press "Enter" (set operating parameters)  
**FACTCAL** & press "Enter" (factory calibrations)

You can choose the following options:

Hyper terminal command

```
$ Q + Enter # To quit  
$ PARAM + Enter # To set operating parameters  
$ FACTCAL + Enter # To access to factory calibrations
```

## 10.4 Set operating parameters (PARAM)

To access each sub-menu option, type:

### Hyper terminal command

```
$ PARAM + Enter # To set operating parameters  
$ # The current setting is shown in bracket
```

DX700 replies.

### Hyper terminal prompt

```
1. Direction deviation (0deg).  
2. Wind speed units (knots).  
3. Sensor ID (SEN1).  
4. Output protocol (BOM A2669).  
5. Direction pot calibration (990).  
6. Free-flow or polled mode selection (free-flow).  
7. Boot up message enable or disable (enable).  
8. COM configurations.  
<ESC> Exit..
```

Select which parameter you wish to update (enter values between 1-8):

### 10.4.1 Direction deviation:

The direction deviation is used to set the offset of the pot. A value of zero means that North corresponds to the dead band location on the pot. A value of 270 means that North now corresponds to 270 degrees pot rotation, so that the dead band location on the pot will generate an East output (90 degrees). Entering 180 will shift this around 180 degrees so that full scale will move to South.

### Hyper terminal command

```
$ 1 # Press 1 to select the direction deviation menu
```

NMEA module replies.

#### Hyper terminal command

**Enter wind deviation (0-359):**  
**\$ 90 + Enter** # Enter the orientation of the dead band with respect to North in degrees (here we choose 90 degrees for the purpose of the example)

### 10.4.2 Wind speed units:

This will set the wind speed units. Wind speed units are set to knots for BOM output, but can be changed for NMEA output.

#### Hyper terminal command

**\$ 2** # Press 2 to select the wind speed unit menu

NMEA module replies.

#### Hyper terminal command

**Enter wind speed units (0-4)**  
**0 = Default NMEA format**  
**1 = mph**  
**2 = knots**  
**3 = km/hr**  
**4 = m/sec**  
  
**\$ 1 + Enter** # Select the option between 1-4



### 10.4.3 Sensor ID (when device set as free-flow mode):

This will set the “Sensor ID”.

#### Hyper terminal command

```
$ 3 # Press 3 to select the “SensorID” menu
```

NMEA module replies.

#### Hyper terminal command

```
$ NAME + Enter # Type 4-character ID and press enter (we chose  
“NAME” as the ID for the purpose of this example)
```

### 10.4.4 Polled Sensor ID (when device set as polled mode):

In order to set the polled “Sensor ID”, first set the output mode to polled and then select press option 3, polled “Sensor ID”.

#### Hyper terminal command

```
$ 3 # Press 3 to select the polled “SensorID”
```

NMEA module replies.

#### Hyper terminal command

```
Enter 1 character polled “SensorID”:  
$ A + Enter # Enter 1character ID (we chose “A” as the ID for the  
purpose of this example)
```

### 10.4.5 Output protocol

Output protocol may be BOM or NMEA. In BOM mode, the communication settings are 1200,7, E,1. In NMEA mode, the communication settings are 4800,8, N,1.

Note – If the polled mode is selected the output protocol is automatically set to BOM.

#### Hyper terminal command

**\$ 4** # Press 4 to select the output protocol

NMEA module replies.

#### Hyper terminal command

**Output protocol (1-2):**  
**1 = NMEA**  
**2 = BOM A2269**  
**\$ 1 + Enter** # Select 1 or 2 and press "Enter"

### 10.4.6 Direction pot calibration

The direction pot calibration mode is used to set the full-scale reading of the pot. The number shown in brackets is the raw digital sample value for a full scale reading on the pot.

This setting is factory pre-set to suit a nominal 1k pot as used in the SYN-706. It is best to perform a calibration when the system has been installed in its final location.

If a different SYN-706 unit is installed at a later date, a re-calibration should be performed.

#### Hyper terminal command

**\$ 5** # Press 5 to select the pot calibration

NMEA module replies.

#### Hyper terminal command

**Remove wire from wiper input on WD pot input and short wiper and ref inputs then press <enter>**

# Short wiper and ref inputs and then press enter

\$ **Enter**

Select user parameter to update (current values shown in brackets):

1. Direction deviation (0deg).
  2. Wind speed units (knots).
  3. SensorID (SEN1).
  4. Output protocol (BOM A2669).
  5. Direction pot calibration (990).
  6. Free-flow or polled mode selection (free-flow).
  7. Boot up message enable or disable (enable).
  8. COM configurations.
- <ESC> Exit.

#### 10.4.7 Free-flow or polled mode selection:

Set the output mode (polled or free-flow). If set to polled mode option 3 "Sensor ID" will replace by polled "Sensor ID". Then the option 4 "Output Type" set to "BOM".

#### Hyper terminal command

\$ **6** # Press 6 to select the mode

NMEA module replies.

#### Hyper terminal command

please select the mode of operation

1 = Free-flow

2 = Polled

\$ **1 + Enter** # Select 1 or 2 and press "Enter"

### 10.4.8 Boot up message enable or disable:

This enables or disables the boot up message.

Note: During the polled mode this setting will be disregarded and no boot up message will be displayed.

#### Hyper terminal command

**\$ 7** # Press 7 to select the boot up message

NMEA module replies.

#### Hyper terminal command

**Boot up message "Enable" or "Disable"**  
**1 = Enable**  
**2 = Disable**  
**\$ 1 + Enter** # Select 1 or 2 and press "Enter"

### 10.4.9 Serial communication:

This option configures the serial communication settings. Normally the device is set to its default settings (1200, 7, E, 1).

| Available communication settings |                                 |
|----------------------------------|---------------------------------|
| Baud rates                       | 300, 1,200, 2,400, 4,800, 9,600 |
| Parity                           | no parity, odd, even            |
| Data lengths                     | 7 and 8                         |
| Stop bits                        | 1 and 2                         |

An example below shows the menu as displayed when the unit configuring its communication setting.

#### Hyper terminal command

**\$ 8** # Press 8 to select the serial communication settings

NMEA module replies.

#### Hyper terminal command

##### Serial data configurations

Select 1 to 4 or press [Esc] to Exit

1. Baud (1200)
2. Data bits (7)
3. Parity (Even)
4. Stop bits (1)

\$ **1 + Enter** # Select 1-4 and press "Enter"

# Note- current settings are shown in brackets and in this example, it set to 1200, 7, E, 1.

#### 10.4.10 Serial communication/ baud:

If you previously selected baud, NMEA module replies.

#### Hyper terminal command

##### Select baud rate (1 to 5)

1. 300
2. 1200
3. 2400
4. 4800
5. 9600

\$ **5 + Enter** # Select 1-5 and press "Enter"

##### Serial data configurations

Select 1 to 4 or press [Esc] to "Exit"

1. Baud (9600)
2. Data bits (7)
3. Parity (Even)
4. Stop bits (1)

# Note- values inside the brackets changed when 9600-baud was selected. New settings only take effect when exiting of the PARAM menu.

```
# Please Exit PARAM menu to apply newly modified COM settings
$ Esc      # to exit communication menu
$ Esc      # to exit PARAM menu
```

**Updating user parameters...**

**Your current COM settings are  
9600 baud, 7 data bits , even 1 stop bits**

When exiting the PARAM menu, the device will always show configured communication settings. If the user current terminal settings are different to what is shown in the text then change the terminal accordingly and then press Q and "ENTER". This will put the device in normal run mode in the newly configured settings.

#### Hyper terminal command

```
Please adjust your terminal accordingly and then press 'Q' & press "Enter" to  
quit or reset power.
```

```
$ Q + Enter      # Select Q and press "Enter"
```

```
Exiting command mode...  
SEN1,030,000,01,843
```

To check the newly configured communication settings type \$CMD and then PARAM the press 8.

#### Hyper terminal command

```
$ CMD + Enter      # To access command functionality
$ PARAM + Enter    # To set operating parameters
$ 8 # Press 8 to select the serial communication settings
```

```
Serial data configurations  
Select 1 to 4 or press [Esc] to "Exit"
```

- 1. Baud (9600)**
- 2. Data bits (7)**
- 3. Parity (Even)**
- 4. Stopbits (1)**



## 10.6 Factory calibrations (FACTCAL)

To access the command mode, type:

### Hyper terminal command

```
$ CMD + Enter # To access command functionality  
$ # Or  
$ CMDCR # Send CMDCR through modem
```

NMEA module replies.

### Hyper terminal prompt

```
Enter user command (O & press "Enter" to quit):  
  
PARAM & press "Enter" (set operating parameters)  
FACTCAL & press "Enter" (factory calibrations)
```

Choose the FACTCAL option:

### Hyper terminal command

```
$ FACTCAL + Enter # To access to factory calibrations
```

NMEA module replies.

### Hyper terminal prompt

```
Select factory parameter to update (current values shown in brackets):  
1. Analog input selection (1)  
2. Anemometer pulses/rev (5)  
3. Anemometer transfer coefficient (0.35 rev/m)  
4. Direction pot dead band (4deg)  
<ESC> Exit.
```



### 10.6.1 Analog input selection:

The analog input selection can only be set to type 1 at present. This specifies a tacho generator wind speed input and pot wind direction input as per the SYN-706/732.

#### Hyper terminal command

```
# From FACTCAL Menu
$ 1 # Press 1 to select the analog input selection

1. Pulse wind speed & 360 degree pot wind direction.
Enter selection (1):

$ 1+ Enter # Press 1 and press "Enter"
# Note: there is only one selection
```

### 10.6.2 Analog input selection:

The analog input selection can only be set to type 1 at present. This specifies a tacho generator wind speed input and pot wind direction input as per the SYN-706/732.

#### Hyper terminal command

```
# From FACTCAL menu
$ 1 # Press 1 to select the analog input selection

1. Pulse wind speed & 360 degree pot wind direction.
Enter selection (1):

$ 1+ Enter # Press 1 and press "Enter"
# Note: there is only one selection
```

### 10.6.3 Anemometer pulses per revolution

Anemometer pulses per revolution should be set to suit the anemometer to be connected. For a type SYN-732 anemometer, this is 5 pulses per revolution.

#### Hyper terminal command

```
# From FACTCAL menu
$ 2 # Press 2 to select the anemometer pulses/rev

Enter anemometer pulses/rev (1-64):

$ 05 + Enter # Type the appropriate value between 1-64 and press
"Enter "
# Note: If you need to input 5 pulses type 05 and then Enter
```

### 10.6.4 Anemometer transfer coefficient

Anemometer transfer coefficient should be set to suit the anemometer to be connected. For a type SYN-732 anemometer, this is 0.35 revolutions per meter.

#### Hyper terminal command

```
# From FACTCAL menu
$ 3 # Press 3 to select the anemometer transfer coefficient

Enter anemometer transfer coefficient:

$ 0.35 + Enter # Type the appropriate value

# Note: Correct format is "#.##" eg- 0.35 not .35
```

### 10.6.5 Direction pot dead band

Direction pot dead band relates to the angle of rotation of the wind direction pot that does not produce an electrical output proportional to the position of the shaft.

This is the area between zero output and full-scale output on the pot. If the dead band is set to 4 degrees, the DX700 will only report wind direction readings in the range of 2 to 358 degrees, plus 360 degrees in the dead band. It is common to set up the anemometer so that the dead band is located in the direction of least prevailing winds.

The direction deviation is then set to adjust the DX700 output to match the setup of the anemometer.

#### Hyper terminal command

# from FACTCAL menu

\$ **4** # Press 4 to select the direction pot dead band

**Enter direction pot dead band (0-10 degrees)**

\$ **5 + Enter** # Type the appropriate value between 1-10

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