



**RIMCO, MIDDLETON, SYNCHROTAC.**  
Precision Weather Monitoring Instruments



**SYNCHROTAC 706 SERIES.  
DATA SHEET AND  
INSTALLATION  
INSTRUCTIONS**

Ver 4.52 © 2010  
SYN706 Manual V4\_52.pdf

 **OBSERVATOR**  
*instruments*

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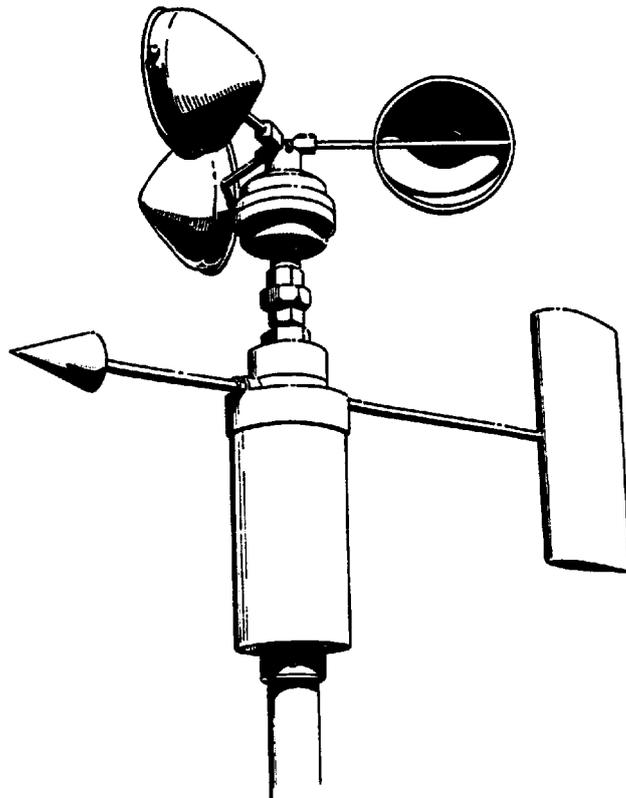






**RIMCO, MIDDLETON, SYNCHROTAC.**  
Precision Weather Monitoring Instruments

## **SYNCHROTAC 706 SERIES HEAVY DUTY WIND TRANSMITTER**



### **Synchrotac 706 Series Heavy Duty Wind Speed and Direction Transmitter**

Designed for general 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 732 - poly-phase linear generator; the 734 - isolated switch contact closure; and the 736 for opto-electronic pulse output. The wind direction models may be either the 706 unit - 360° precision potentiometer or the 724 unit utilising a ganged 540° potentiometer assembly.

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

# Series 706 Heavy Duty Wind Speed and Direction Transmitter

## General Specifications

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 ¾ inch (speed only) or 1½ inch (speed & direction) male 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.

The wind speed section may be any one of three user selected technologies. The type **732** is a ten pole ac generator, the type **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 **706** is a potentiometric transducer, and the type **724** is a 540° configuration employing two precision potentiometers.

### Wind Speed Transmitter Section - General

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	¾" BSP Female Thread.
Maximum Wind Speed	>100m/sec (>200 knots)
Accuracy	Better than ±3% above 5m/sec.
Transfer Coefficient	0.35 revs/meter

### Wind Direction Transmitter Section - General

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	1½" BSP Female Thread.
Starting Threshold	<0.7m/sec.
Mechanical Travel	360° (continuous).
Operating Temperature	-40°C to +60°C.

### Type 732 Wind Speed Transducer

Transducer	Permanent magnet 10 pole ac generator. 5 cycles/rev.
Signal Output	136mV/m/sec, and 1.8Hz/m/sec @>3m/sec.
Starting Threshold	<0.7 m/sec.
Output Resistance	22 ohms nominal.
Operating Temperature	-40°C to +60°C.

### Type 706 Wind Direction Transducer

Transducer	1 kΩ precision potentiometer.
Electrical Travel	Better than 354°.
Max Transducer Voltage	12V dc continuous.

### Type 734 Wind Speed Transducer

Transducer	Magnetically actuated reed switch.
Output	Momentary contact closure. VER 1 single closure per cup set revolution, VER 2 five closures per cup set revolution.
ON resistance	8.2 ohms nominal.
Starting Threshold	<0.6 m/sec.
Contact Rating	48Vdc/30Vac, 0.3A max. Load must be non-inductive.
Operating Temperature	-40°C to +60°C.

### Type 724 Wind Direction Transducer

Transducer	Two 1 kΩ precision potentiometers ganged 180° apart.
Electrical Travel	540°.
Max Transducer Voltage	12V dc continuous.

### Combined Wind Speed and Direction Sections

Overall Height	568mm (22.4").
Overall Weight	12kg. (26.4lbs)

### Ordering Information

Wind Speed Only Order	SYN732, SYN734 or SYN736 as required.
Wind Speed & Direction	Start with wind direction section and add wind speed section preceded by a slash.
Example	SYN706/732
Options	Ordered separately.

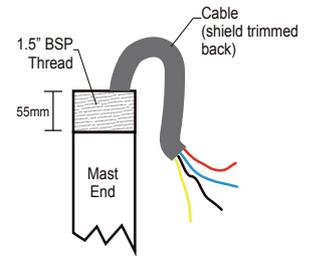
### Type 736 Wind Speed Transducer

Transducer	Opto-electronic.
Output	From 1 to 30 pulses per cup set revolution either 5V or 1mA (to be specified at time of order). Default is 5 pulses/rev.
Starting Threshold	<0.5 m/sec.
Power Requirements	4 - 28V dc, 12mA.
Operating Temperature	-20°C to +60°C.

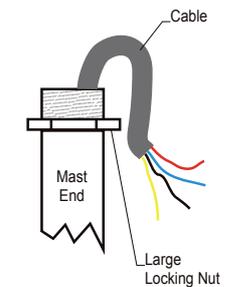
Specification subject to change without notice.

## INSTALLATION INSTRUCTIONS (full instrument SYN7yy/73x - wind direction and wind speed).

1. Prepare a mast to appropriate height, with at least 250mm of pipe at top threaded to 1½" B.S.P. 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 packing 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 screw located on its underside, and turning 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 B.S.P. 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:



Prepare mast end and cable



Fit large locking nut

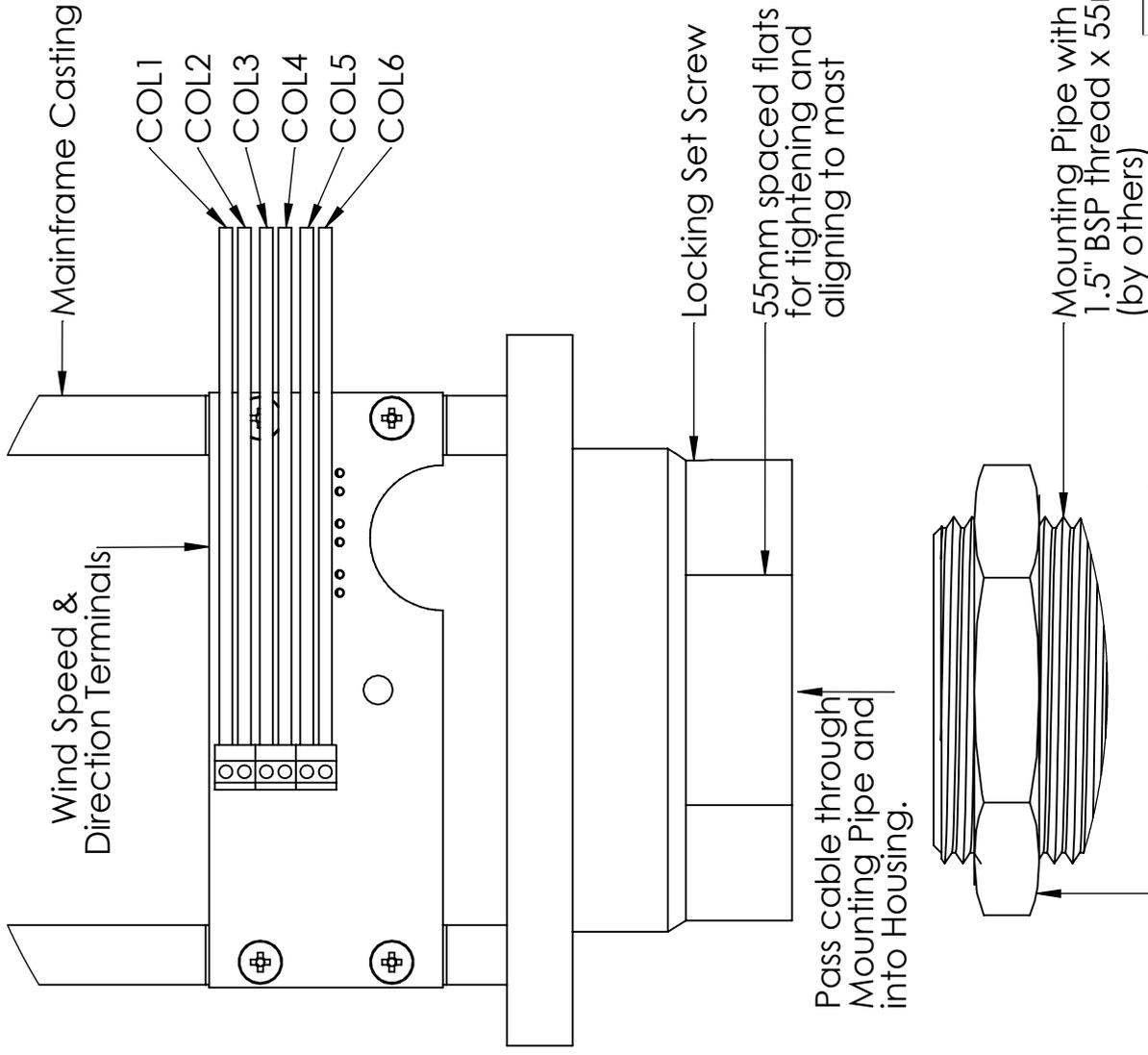
Note carefully before the removal of the wind direction cartridge the position of all parts in relation to each other. Slacken the 4 set screws in the main frame that holds the direction cartridge in position, but only far enough to allow the clamp and direction cartridge to be lowered and removed. Place 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 the boss 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 earthing 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. **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. 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 setscrew.
  11. Test the unit for proper performance. Ensure there is a good earthing contact between the instrument body and the mast pipe.
  12. If properly installed, the Synchronac 706 series wind speed and direction transmitter should require no maintenance for many years.
- \* The characteristics of a suitable cable is dependant on the instrument used and the application environment. As a minimum the cable should contain at least 2 cores for the SYN732 and 734, 3 cores for the SYN736, 5 cores for the SYN706/732 and SYN706/734 and 6 cores for the SYN706/736 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 SYN734 anemometer version. High cable capacitance can shorten the life of the reed switch units in the SYN734 due to the high current discharge it may cause each time the switch closes - a limiting resistor is installed in the SYN734 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 on of its components working loose under conditions of prolonged thermal or mechanical stress.



Screw on locking nut before fitting anemometer to the pipe.

Tighten locking nut against the anemometer base once the anemometer has been fitted and aligned.

	SYN736	SYN734	SYN732
COL1	Wiper	Wiper	Wiper
COL2	0v	0v	0v
COL3	Ref	Ref	Ref
COL4	Output	---	---
COL5	Common	SW1	AC1
COL6	DC	SW2	AC2

UNLESS OTHERWISE STATED:  
DIMENSIONS ARE IN MILLIMETRES  
TOLERANCES:  
ANGULAR:  $\pm 0.5^\circ$   
LINEAR:  $\pm 0.2\text{mm}$

ISSUE    Change Note No.    DATE

B    78/96    01/04/96

C    80/02    13/08/02

D    58/03    26/06/03

E    XX/11    01/12/12

**OBSERVATOR**  
instruments

Third-Angle Projection

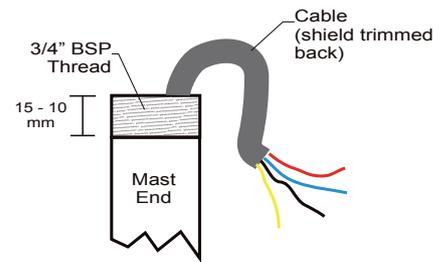
TITLE: SYNCHROTAC 7XX INSTALLATION  
TERMINATION DETAILS

DRAWN: MC    09/06/15    DWG NO.: 3285    ISSUE: F

APP'VD: NP    09/06/15    SCALE: NTS    DO NOT SCALE DRAWING    SHEET 1 OF 1

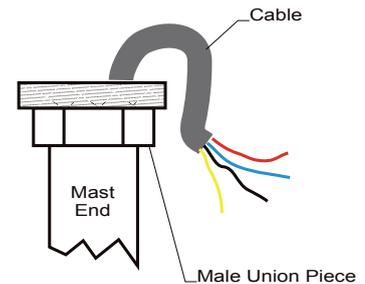
## INSTALLATION INSTRUCTIONS (anemometer section only - SYN732/734/736).

1. Prepare a mast to appropriate height, with at least 250mm of pipe at top threaded to 3/4" B.S.P. 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.



Prepare mast end and cable

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.



Fit male union piece

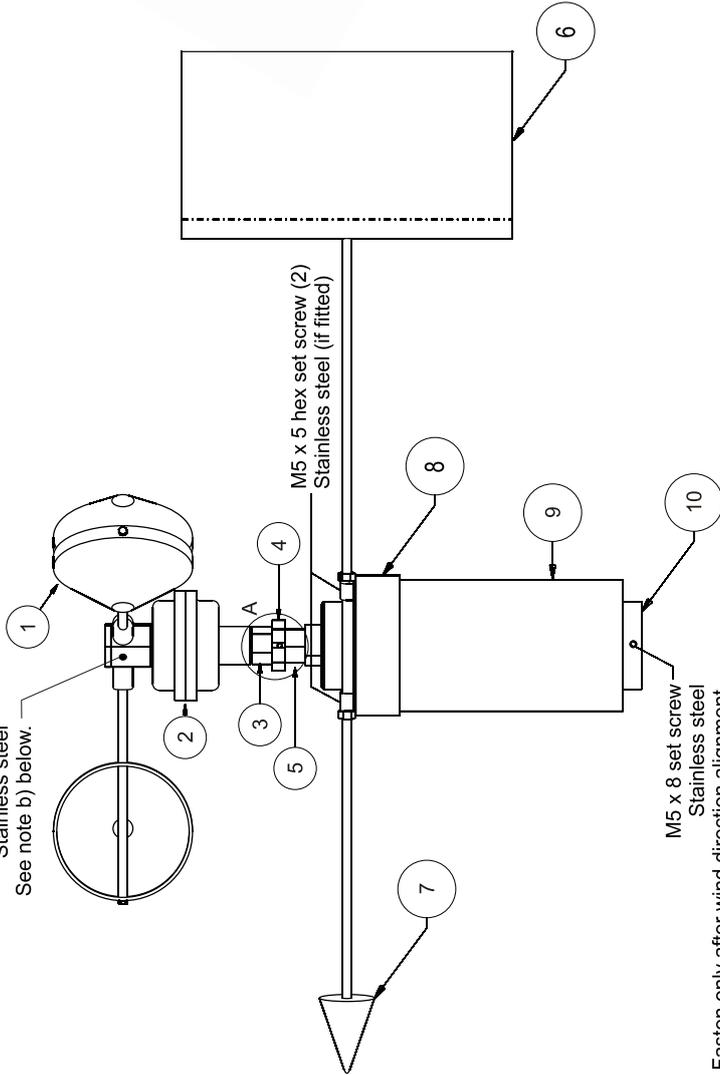
4. The mating female connector should be properly terminated to the cable protruding from the top of the mast pipe.
5. Mate the female connector into the plug at the base of the anemometer body. Care should be taken to ensure the connectors are properly mated. The pins are numbered and keyed.
6. **Apply 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 earthing 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.

- \* The characteristics of a suitable cable is dependant on the instrument used and the application environment. As a minimum the cable should contain at least 2 cores for the SYN732 and 734, 3 cores for the SYN736, 5 cores for the SYN706/732 and SYN706/734 and 6 cores for the SYN706/736 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 SYN734 anemometer version. High cable capacitance can shorten the life of the reed switch units in the SYN734 due to the high current discharge it may cause each time the switch closes - a limiting resistor is installed in the SYN734 to assist in the protection of the reed switches contained therein.

**SAFETY NOTE:**

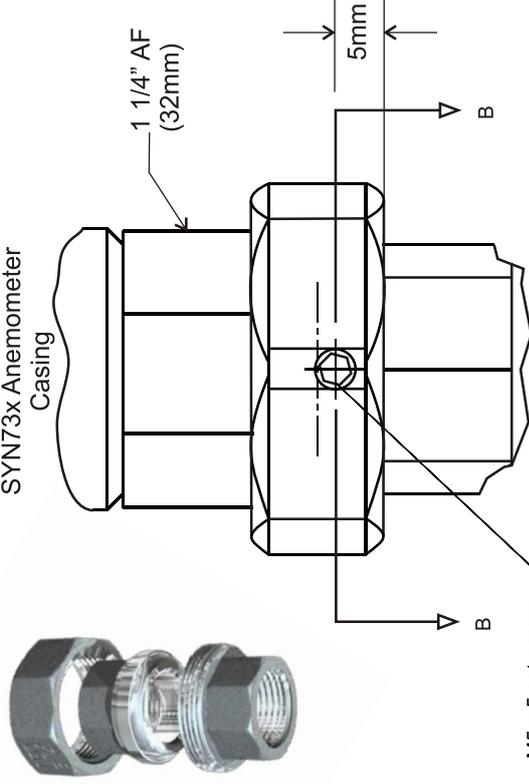
To ensure the instrument remains properly installed in service make sure a suitable and quality thread adhesive is used where stipulated. Failure to do so may result in the instrument or on of its components working loose under conditions of prolonged thermal or mechanical stress.

M5 x 8 set screw - 2 off  
Stainless steel  
See note b) below.

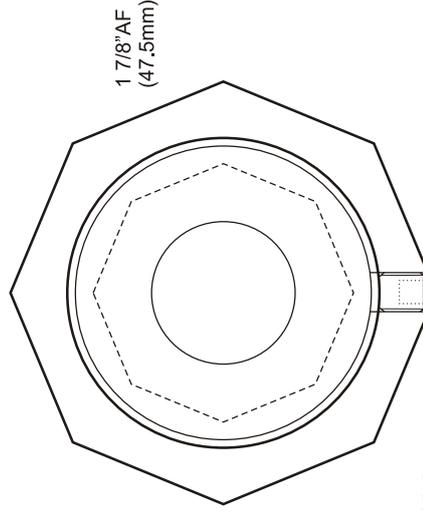


M5 x 8 set screw  
Stainless steel  
Fasten only after wind direction alignment.

SYN73x Anemometer  
Casing



M5 x 5 set screw  
Stainless steel  
See note c) below.



VIEW B-B

**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.
- c) The Union Mating Nut (4) must be tightened to a torque setting of 20 N.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.



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Tolerances:  
Lin  $\pm 0.2\text{mm}$ ,  
Ang  $\pm 0.5^\circ$ .  
Unless otherwise stated.

IS. C/N DATE

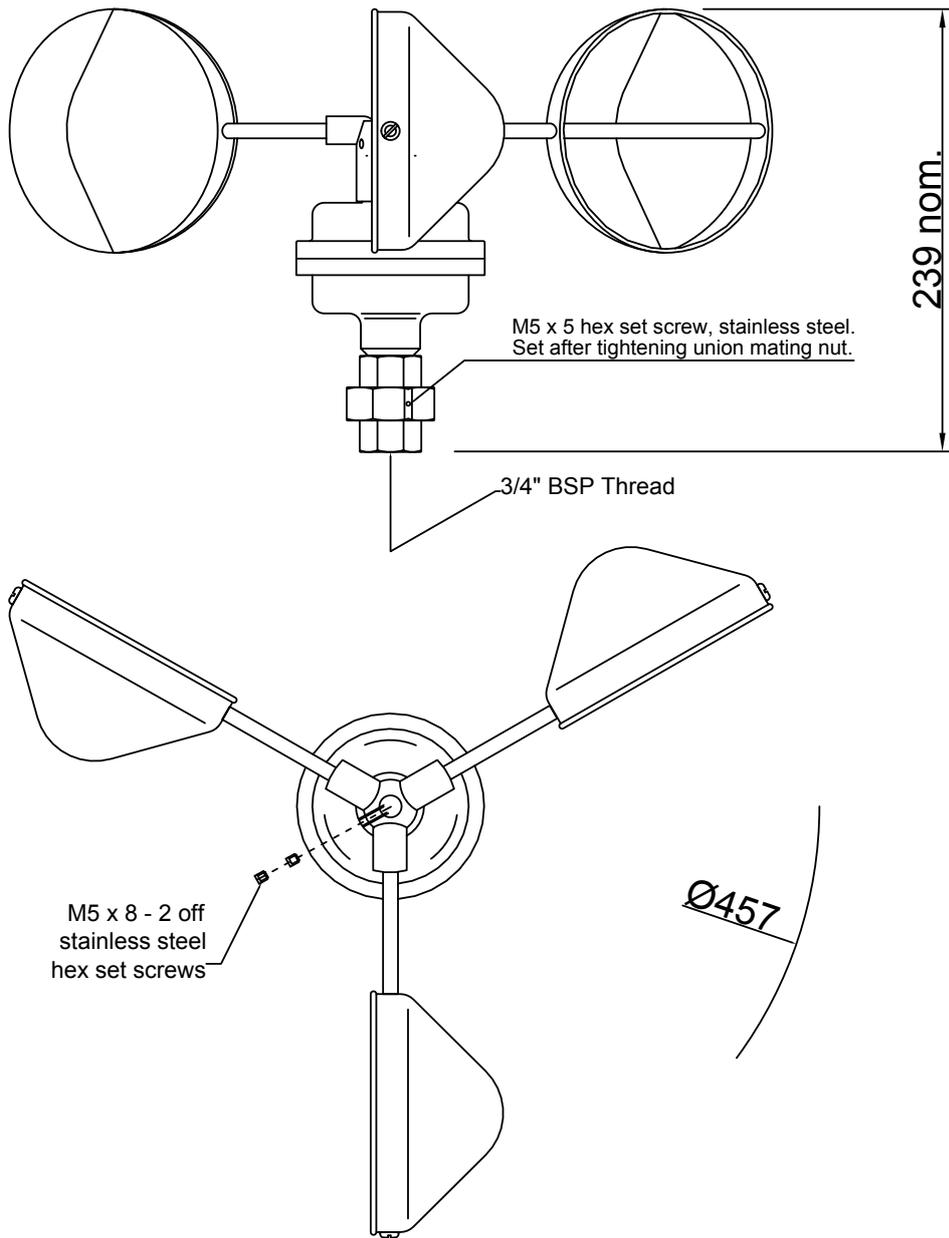
Status



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SYNCHROTAC 706/73x MECHANICAL OUTLINE  
AND INSTALLATION NOTES

DRN	JVDV	22/3/05	SHEET	SCALE	DWG No.	ISS
APP	KH	22/3/05 <td>OF <td>NTS <td>TBA <td>A </td></td></td></td>	OF <td>NTS <td>TBA <td>A </td></td></td>	NTS <td>TBA <td>A </td></td>	TBA <td>A </td>	A



**Safety Notes:**

When securing the cup set onto the anemometer shaft, ensure 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.

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.

IS	C/N	DATE				2004 Copyright	Status P			
			Tolerances Lin ±0.2mm Ang ±0.5°	SYN73x Anemometer Mechanical Outline						
			Unless otherwise stated.					DRN	JVdV	19/2/04

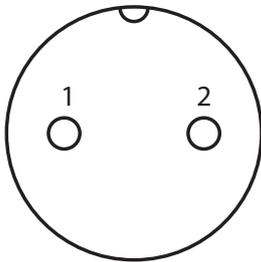


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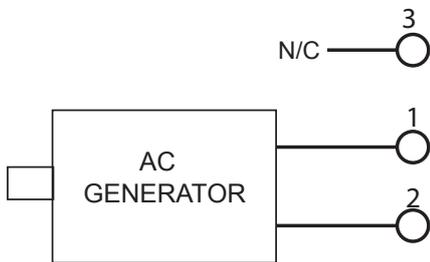
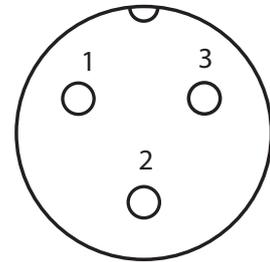
Precision Weather Monitoring Instruments

## SYNCHROTAC 706 SERIES CONNECTOR PIN ASSIGNMENT

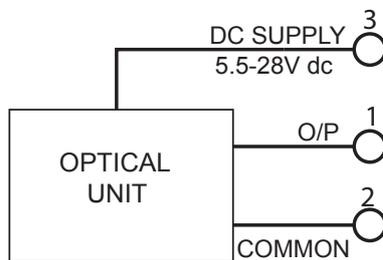
### 73x ANEMOMETERS



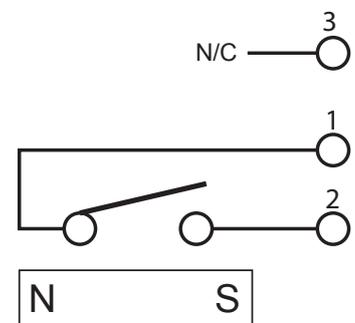
Viewed looking at the  
base of the Anemometer



SYN732



SYN736

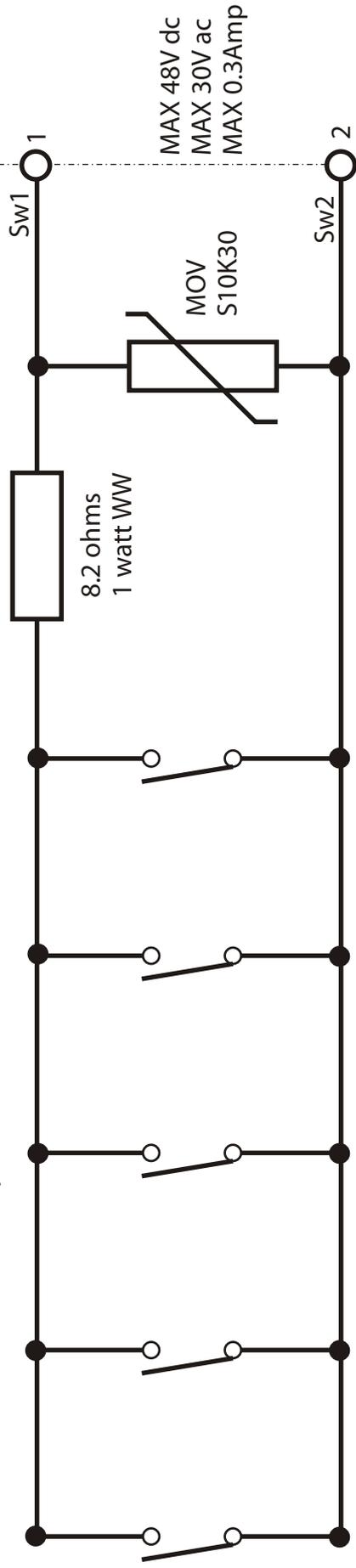


SYN734V1 (1 switch)  
SYN734V2 (5 switches)

706con3.cdr, 2/05

IS	C/N	DATE			© Copyright 2005					
			Tolerances Lin $\pm 0.2\text{mm}$ Ang $\pm 0.5^\circ$	SYNCHROTAC 73x TYPE ANEMOMETER CONNECTOR PIN ASSIGNMENT						
			Unless otherwise stated.							
				DRN	JVdV	1/6/95	SHEET	SCALE	DWG No	ISS
				APP	RMcP	1/6/95	1 of 1	NTS	TBA	B

Reed Switch  
50V ac/dc rating  
0.5Amp non-inductive.

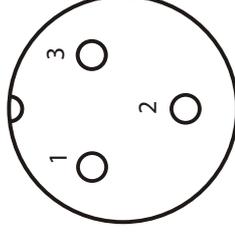


MAX 48V dc  
MAX 30V ac  
MAX 0.3Amp

VER 1  
(one switch only)

VER 2  
(5 switches)

Connector at  
base of anemometer



Viewed looking at the  
base of the Anemometer

Note:  
Reed switch life can be adversely affected by long cable runs due to cable capacitance and inductive loads. Use low capacitance cable where ever possible and ensure the end load is resistive.

IS	C/N	DATE		<b>OBSERVATOR</b> <i>instruments</i>	© 2003	Status C
			Tolerances Lin $\pm 0.5$ mm Ang $\pm 0.5^\circ$ Ang Unless otherwise stated.	<b>SYN734 Anemometer</b> <b>Circuit Schematic</b>	SCALE NTS	DWG No TBA
				DRN KH APP	SHEET 1 OF 1	ISS A
				24/11/03		



# RIMCO, MIDDLETON, SYNCHROTAC.

Precision Weather Monitoring Instruments

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## APPLICATION NOTE

### Positioning of Wind Speed Instruments

The World Meteorological Organisation (WMO) states that an anemometer for the purpose of measuring surface winds should be mounted 10 metres 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.

### Locating Instruments on or near Structures

Generally accepted guide-lines for locating wind systems around an obstruction while keeping instruments in the ambient airflow.

**1. For structures up to 10 metres in height.**

- ? 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 10 metres height.**

- ? 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 2 metres height may be sufficient.

File: Wind Application Note 1.doc



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# EC DECLARATION OF CONFORMITY ACCORDING TO COUNCIL DIRECTIVE 89/336/EEC

WE, MCVAN INSTRUMENTS PTY LTD, DECLARE UNDER OUR SOLE RESPONSIBILITY THAT THE PRODUCTS:

**SYNCHROTAC 706 SERIES WIND INSTRUMENTS**  
SYN732, SYN734V1, SYN734V2, SYN736  
SYN706/732, SYN706/734V1, SYN706/734V2, SYN706/736  
SYN724/732, SYN724/734V1, SYN724/734V2, SYN724/736

MANUFACTURED BY:

**MCVAN 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 COMPATIBLY.

THIS DECLARATION OF CONFORMITY IS BASED UPON COMPLIANCE OF THE PRODUCT WITH THE FOLLOWING HARMONISED 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:



JOHN VAN DE VREEDE – DIRECTOR.

DATE OF ISSUE: 1 DECEMBER 2003.

PLACE OF ISSUE: MCVAN INSTRUMENTS PTY LTD  
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## NOTES



**OBSERVATOR**  
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