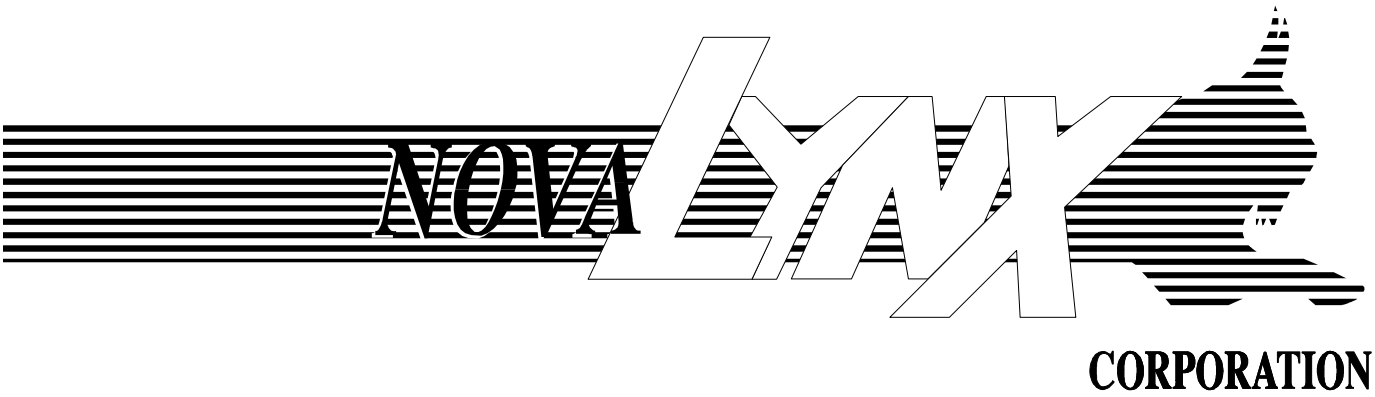
NOVALYNX CORPORATION

MODEL 100-2130
COMBINATION WIND SENSOR

INSTRUCTION MANUAL



Receiving and Unpacking

Carefully unpack all components and compare to packing list. Notify NovaLynx Corporation immediately concerning any discrepancy. Inspect equipment to detect any damage that may have occurred during shipment. In the event of damage, any claim for loss must be filed immediately with the carrier by the consignee. Damages to equipment sent via Parcel Post or UPS require the consignee to contact NovaLynx Corporation for instructions.

Returns

If equipment is to be returned to the factory for any reason, call NovaLynx between 8:00 A.M. and 4:00 P.M. Pacific Time and request a Return Authorization Number (RA#). Include with the returned equipment, a description of the problem and the name, address, and daytime phone number of the sender. Carefully pack the equipment to prevent damage or additional damage in the return shipment. Call NovaLynx for packing instructions in the case of delicate or sensitive items. If packing facilities are not available take the equipment to the nearest Parcel Post, UPS, or freight service and obtain assistance with the packaging. Write the RA# on the outside of the box.

Warranty

NovaLynx Corporation warrants that its products are free from defects in material and workmanship under normal use and service for a period of one year from the date of shipment from the factory. NovaLynx Corporation's obligations under this warranty are limited to, at NovaLynx's option: (i) replacing; or (ii) repairing; any product determined to be defective. In no case shall NovaLynx Corporation's liability exceed product's original purchase price. This warranty does not apply to any equipment that has been repaired or altered, except by NovaLynx Corporation, or that has been subjected to misuse, negligence, or accident. It is expressly agreed that this warranty will be in lieu of all warranties of fitness and in lieu of the warranty of merchantability.

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COMBINATION WIND SENSOR
Model 100-2130

1.0 GENERAL DESCRIPTION

NovaLynx Corporation provides the Model 100-2130 Combination Wind Sensor for use with the self-contained weather station, Model 100-1950. The Combination Wind Sensor is an economical sensor with good durability and survey quality accuracy. The sensor features a three-cup anemometer with an AC generator and a vane with a potentiometeric transducer. The output of the AC generator is proportional to the wind speed. Wind direction is sensed by the vane and converted into a varying DC voltage through the 120 ohm potentiometer element housed inside the vane.

A single support arm provides mounting of both sensors onto a vertical mast or pipe. The arm is constructed to allow the anemometer to sit directly below the vane. Two clamping screws provide attachment support

Signals for both sensors are routed through a single cable with five conductors, two for speed and three for direction. The fifty foot long cable is terminated by a five pin DIN connector. The cable is a ribbon style, flat cable. Use care in installing the cable to avoid damaging the cable insulation.

2.0 SPECIFICATIONS

Wind Speed Sensor:	3-Cup Wheel with AC Generator
Cup turning Radius:	4-1/2"
Cup Wheel Weight:	2 oz.
Wind Direction Sensor:	Vane with 120 ohm Potentiometer
Vane Turning Radius:	12"
Size:	11" w x 16" hi x 24" d (280 x 407 x 610 mm) Including vane tail
Weight / Shipping	7.5 lbs / 10 lbs (3 kg / 5 kg)

3.0 INSTALLATION

The anemometer and vane are inspected and tested prior to shipment. It is recommended however to perform a manual test of the sensor operation before permanently installing the sensor outdoors.

For best results, the sensor must be mounted vertically in a clearing with no nearby structures or vertical obstructions that will block wind flow. Buildings, trees and other large objects will deflect the wind, creating eddy currents and causing general errors in the wind readings. Winds are usually measured at heights from ten to thirty feet (three to ten meters) above ground level. Additional height is recommended in areas where there are obstructions. Roof top installations for example, require that the sensor be at a height 1-1/2 times the height of the building. When this becomes impractical, the sensor should be no less than thirty feet above the roof and on the upwind side of the building.

3.1 Initial Testing

With the sensor attached temporarily to the display panel or recorder, rotate the cup wheel by hand. See that the wind speed meter pointer moves from zero to some increased wind speed value and returns to zero after the rotation has ceased. Rotate the vane by hand in a clockwise direction as viewed from above the sensor. Observe the wind direction meter to see that the pointer increases in its reading going from 90 to 180 then to 270 and to 360 and finally back to 90 degrees Azimuth. The pointer should return to the zero mark each time the vane nose cone crosses the 90 degree point.

3.2 Vane and Cup Attachment

Before final installation, install the vane tail and counter-weight onto the wind direction sensor. Balance the counter-weight and tail shaft until the vane does not turn whenever the sensor is held on its side and the vane tail is released in any position. This may take several tries to get the tail perfectly balanced.

Place the cup wheel onto the anemometer shaft. Secure the cup wheel using the washer, nut, and acorn nut supplied with the sensor.

WARNING: These nuts have LEFT HANDED THREADS. Do not use excessive force. Avoid damaging the threads. To prevent corrosion and to ease removal at a later time, coat the threads with bee's wax.

3.3 Sensor Mounting

Place the support arm over the top of the mast or pipe support. Fasten the clamping screws to secure the sensor to the mast. Rotate the support arm back and forth several times to cut a groove into the mast. Then tighten the clamping screws again in these

grooves. This helps secure the sensor to the mast. Do not use any wrenches on the clamping screws.

Route the sensor cable down the mast and to the display panel or recorder in the most direct manner possible. If possible run the cable down the inside of the mast. Avoid crimping or crushing the cable between the sensor and the mast. A slot can be cut into the top of the mast to bring the cable to the outside of the mast. Secure the cable every two to three feet using cable ties or clamps. The cable should not move in high winds otherwise damage will occur to the cable insulation. Exposed cable wires may make the sensor inoperable and can cause damage to the display panel or recording device. The cable may be extended to a length of 1,000 feet if necessary. Some minor degradation of the signal may occur at this great length. Cable resistance should not exceed 5 ohms per conductor.

3.4 Sensor Orientation

With the sensor in place, rotate the vane slowly. Have an observer watch the wind direction meter. As the wind vane nose (counter-weight point) crosses East or 90 degrees Azimuth the meter should indicate East or 90 degrees just before it jumps back to the meter zero which is also East or 90 degrees. Look at the vane nose at this point in time. It should be pointing East. if it is not pointing East or if the meter is not indicating East, check the orientation of the vane. The North marks located on the sensor housing should be on the North side of the sensor support and facing toward North. If a map is available, locate a large object to the north of the sensor location. Site on this large object and rotate the sensor until the sensor's North marks are aligned with the large object. At this point, check the sensor and meter operation again to verify that the meter indicates correctly. Rotate the vane slowly and in a clockwise direction. Check to see that the meter indicates correctly. If this procedure does not produce the desired results, check the sensor wiring at the display panel or recorder to make certain that the wires have not been connected in error.

4.0 CALIBRATION

4.1 Wind Speed

The wind speed calibration of the anemometer is fixed by the design of the three-cup wheel and its response to changing winds. The anemometer response is determined through wind tunnel testing. A chart showing the results of the wind tunnel tests is included in this manual. Verification of the sensor operation can be made by the operator using a wind speed spin-up motor. By spinning the anemometer shaft at a known rpm, a fixed output can be produced and recorded. This recorded value may then be checked periodically to determine whether or not the AC generator has developed any problems. For best results, use a spin-up motor that produces an rpm of 300 or 600.

To perform the wind speed check, first remove the three-cup wheel from the anemometer shaft. Unbolt the anemometer from the support arm base in order to rotate the generator housing to one side making it easier to attach the spin-up motor. Attach the spin-up motor using rubber tubing to connect the two shafts together. Support the motor and the generator during the test to prevent separation and movement of the housings. Measure the unloaded AC voltage output of the sensor and record the value next to the appropriate rpm for the spin-up motor. Major changes in the reading from one test period to the next may indicate a need to change anemometer bearings or to replace the generator coils or the generator magnet.

4.2 Wind Speed Calibration Chart

Sensor Serial No._____

mph	m/s	rpm	output VAC
10.0	4.5	164	_____
18.5	8.2	300	_____
36.8	16.5	600	_____
73.8	33.0	1200	_____
100.0	44.7	1627	_____
111.0	49.5	1800	_____

Test Date:_____

Tested By:_____

4.3 Wind Direction

Wind direction calibration will vary from one sensor to the next due to irregularities in the potentiometer transducers. Fine tuning of the measuring circuit with the sensor connected eliminates the differences between sensors. The adjustment is made by first rotating the vane to North. Observe the meter reading of the display panel. The reading should increase from zero and stop at the North point. If the sensor and meter have not been properly adjusted, the meter will show some point other than North. Next rotate the vane 90 degrees to the East point. This is the maximum deflection point for the display panel meter. Adjust the meter for maximum pointer deflection. Adjust the circuit span

potentiometer to give the maximum pointer deflection while the vane is held in position. The dead band portion of the wind direction sensor potentiometer should be set so that it is equally divided on either side of the East direction. If this is not the case, the vane tail hub needs to be reset on the shaft of the potentiometer so that the dead band is centered. This adjustment takes considerable patience and is best left to experienced technicians. Contact NovaLynx for assistance.

5.0 MAINTENANCE

The Model 100-2130 Combination Wind Sensor has been designed to be a durable instrument and is suited for continuous use outdoors. Check the sensor periodically for bearing wear and loose hardware. In areas that experience constant winds, replace the sensor bearings annually. Inspect the sensor regularly for signs of corrosion and for cable weathering. Replace any corroded or damaged parts. In situations where there has been considerable corrosion or damage it may be more economical to replace the entire sensor assembly.

6.0 PARTS LIST

MODEL 100-2130
COMBINATION WIND SENSOR

PART NO.	DESCRIPTION	QTY
92025100	SUPPORT ARM	1
92025200	CABLE WITH DIN CONNECTOR	50FT
92025300	VANE AND COUNTER-WEIGHT	1
92025400	HUB, VANE	1
92025500	POTENTIOMETER ASSEMBLY	1
92025600	ACORN NUT, HEX NUT, & WASHER	1
92025700	THREE CUP WHEEL ASSEMBLY	1
92025800	GENERATOR ASSEMBLY	1