# MANUAL - F460 WIND DIRECTION SENSOR P/N M100076 Rev C

## 1.0 INTRODUCTION

Climatronics' F460 Wind Direction Sensor, P/N 100076, is designed to provide low starting threshold, fast dynamic response and high accuracy over a wide operating range under adverse environmental conditions. The Sensor consists of a counterbalanced, lightweight vane attached to a shaft which is coupled to a precision low torque potentiometer. Wind direction via vane position is converted to a proportional dc voltage by a potentiometer.

### 1.1 SPECIFICATIONS

**Accuracy:** ±2°
**Threshold:** 0.22 m/s (0.5 mph)
**Distance Constant:** 1.1 m (3.7 ft) of air max.
**Operating Range:** 0° - 360°
**Damping Ratio:** 0.4 at 10° initial angle of attack
**Operating Temperature:** -40° to 60°C (-40° to 140°F)
**Power Requirement:** 1 mA, max, through 10K ohms
**Signal Output:** Variable dc voltage, magnitude proportional to wind direction
**Size:** 5.7 cm (2.25 inch) maximum diameter
**Turning Radius:** 41.9 cm (16.5 inch)
**Height:** 29.2 cm (11.50 inch)
**Weight:** Less than 0.9 kg (2 lbs.)

## 2.0 INSTALLATION (Refer to Fig 1 & 2)

Be sure to locate the Sensor in a clear, unobstructed area so as to minimize or eliminate any turbulent effects caused by local obstructions (e.g., trees, buildings, etc.) The Sensor is mounted on the prewired F460 Crossarm, P/N 101994. The connector keys and the notch in the lower part of the Sensor body are matched to the alignment pin of the crossarm. Secure the Sensor by tightening the two set screws located at its base.

Attach the vane by matching the vane hub with the shaft hub and lightly tightening the set screws.

**Note:** Applications of Anti-Seize compound on the set screws will facilitate disassembly should it become necessary.

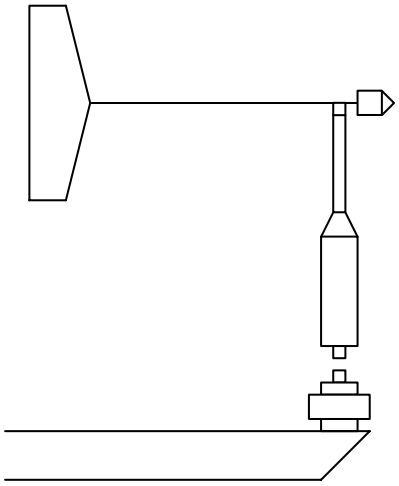
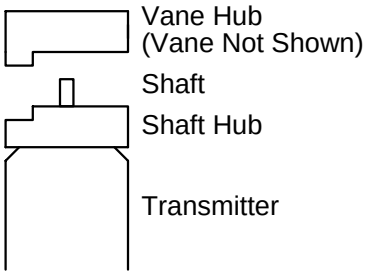


**Figure 1**



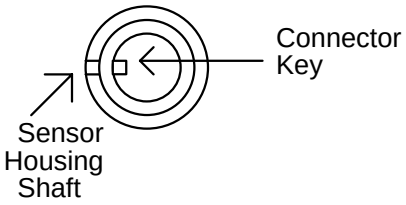




**Figure 2**

**CAUTION !!** The Wind Direction Sensor must be properly oriented with respect to north. For instructions, refer to the Crossarm manual, P/N 101994.

## 3.0 INPUT/OUTPUT CONNECTIONS

The Sensors' connector pin designations are as follows:

| PIN | Function |
|---|---|
| A | Wind Direction Output |
| B | *Heater + |
| C | Ground |
| D | *Heater - |
| E | Not Used |
| F | Pot. +V Input |

*Internal heater connections, optional item.

## 4.0 USER DEFINED OPTIONS

Both internal and external sensor heaters are available. The internal heater is a continuously operating device which consumes 2W per sensor of the 12Vdc sensor power. This heater option is designed to minimize internal moisture build up and requires factory installation. The external heater is thermostatically controlled and is designed to minimize sensor freeze-up in cold environments. This heater option is powered by 110 Vac, requires approximately 20W per sensor, and may be added by the user as a field modification.

## 5.0 USER INTERFACE N/A

## 6.0 THEORY OF OPERATION

Please refer to drawing number 400097, the schematic diagram of the Wind Direction Sensor. Vane position is sensed by a precision low-torque potentiometer, and sent to the translator as a dc voltage. A 1/32 amp fuse is connected in series with the potentiometer for protection from excess current flow through the potentiometer.
**CAUTION !!** When testing the potentiometer, limit the current to a maximum of 25 mA.

## 7.0 CALIBRATION

Adjustment of the Wind Direction Sensor is required only if either the hub (see Drawing No. 100076) has slipped relative to the shaft assembly or if the potentiometer is replaced. If adjustment is required, first calibrate the Wind Direction Signal Conditioner; second, rotate the Sensor shaft until the flat section on the hub is exactly perpendicular to a line drawn through the center of the Sensor and the alignment mark on the Sensor base. Temporarily secure the cap in place with a piece of tape. Third, loosen the two set screws that hold the hub to the shaft and rotate the shaft until a reading of 180° is obtained on a readout device. A voltmeter may also be used for this purpose. It should read one third of the Signal Conditioner's full scale output (±0.5%) for a 0-540° Signal Conditioner. Finally, the set screws should be tightened to lock the cap in place and then the tape removed.

## 8.0 MAINTENANCE

If bearing or potentiometer replacement is necessary, proceed as follows. Drawing 100076 will help in locating the parts described below. Read through the whole procedure before starting.

**1.** Remove the vane by loosening the two set screws that hold it to the shaft and lifting the vane off the shaft.
**2.** Remove the transmitter cover by pulling it toward the base with a slight twisting motion.
**3.** Loosen the upper set screw in the potentiometer coupling with a 1/16 Allen Key.
**4.** Allow the shaft to slide out through the top end of the column.
**5.** Remove and discard the old bearing. If it is necessary to push the bearing out from the bottom of the seats (using a long thin rod or the shaft assembly) the potentiometer must be removed. Refer to the note below before continuing. Pushing lightly all around the bearing is better than too much pressure on one side of the bearing.

**NOTE:** To remove the potentiometer, follow this procedure:
**a.** Using a Phillips head screwdriver, remove the two top screws from the transmitter support. This frees the upper portion of the transmitter.
**b.** Using a flat tip screwdriver, loosen the three retaining clamps and slide the potentiometer out.

After completing the bearing change, re-install the potentiometer by reversing the above steps.

**6.** Place a new bearing on the shaft and guide the shaft back into its hole from the top until the bearing is seated.

**7.** Tighten the set screw in the coupling.

**8.** Adjust the hub as described in Section 7.