

# **Instruction Manual**

## **No. 7910-00 Aero Plane Type Wind Speed & Direction Sensor (Model W639-ED1)**

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EW-S15007

## I. General

Model W639-ED1 is an Aero plane type Wind speed & direction sensor.

Wind speed is output with pulse voltage that is converted by propeller rotation.

As for wind direction, the rotation angle of the counterbalanced tail is detected with a brushless potentiometer and voltage of 0 to 1V is output at 0 to 360 °

## II. Specifications

1. Model : W639-ED1 Aero plane Type Wind Speed & Direction Sensor
2. Wind speed : Photoelectric Pulse type  
60 pulses per a rotation of propeller (3081 pulses at 60m/s)
3. Wind direction : Brushless potentiometer
4. Starting speed : less than 2 m/s
5. Withstand wind speed: 108 m/s (in a wind tunnel)
6. Wind speed Output : Square pulse of 9V peak, Power 12V (load: less than 20mV)
7. Wind direction Output: 0 to 1VDC / 0 to 360°
8. Allowable error : Wind speed : within 0.5m/s at less than 10 m/s  
within 5% of rdg at more than 10 m/s  
: Wind direction : within ±5°
9. Power requirement : 12VDC (possible to use between 10V and 14VDC)
10. Power Consumption: approx. 20mA
11. Input & output connectors: NJW-205-PF10 Cable diameter: 8.6 to 10.5mm
12. Operation ambient : -20 to 50°C (without freeze at the rotating section)
13. Materials : Propeller and body : Polycarbonate resin  
Counterbalanced tail: Polyester resin + Glass-fiber
14. Outer dimensions : Ø250 (W) x 510(D) x 600(H) mm
15. Weight : approx. 3 kg

### III. Handling

#### 1. Installing the propeller of the sensor (refer to the attached sheet No. 1)



Be sure to fully tighten the screw. If the propeller is improperly installed, it may drop, resulting in danger.

- 1) Fit the propeller onto the propeller shaft by aligning the flat surface on the groove with the flat surface on the propeller shaft.
- 2) Push in the propeller until it stops, and then tighten the setscrew for the propeller with a screwdriver.
- 3) Use a screwdriver that has a grip of 24 mm dia. or more to ensure firm tightening. Screwdrivers of smaller grip size cannot generate enough tightening force.

#### 2. Installing the sensor

- 1) Install the generator in a place free of vibration or corrosive gas. The product life will be shortened if it is installed in a place subject to vibration, corrosive gas or direct saltwater splashes. Large vibration could damage the instrument. If vibration is unavoidable, place the instrument in a location where there is least vibration and use a rubber pad to insulate vibration.
- 2) A lightning arrester will help to protect the instrument from failure due to lightning, but it is not possible to protect the instrument from all lightning.
- 3) The sensor should be installed on a flat surface in an open space with a supportive mast, at a height of 10 m above the ground (standard installation place). "Open space" here means that the distance between the generator and any obstacle is at least 10 times the height of the obstacle. If there is no such place available, choose the next-best place.
- 4) If installing the instrument on a rooftop, avoid the effects of wind turbulence by choosing a place nearest to the center of the rooftop and mounting the instrument on a mast 3 m above the roof surface. If the tail fin turns round and round due to the wind direction, it is impossible to measure the wind even if the instrument is properly installed as instructed. To avoid this, before installing, check for wind turbulence by using a flag or the like and then determine the optimal place and height for the instrument.
- 5) On the top of the mast where the generator is mounted, fit a flange whose bolt hole fits the bolt hole on the generator, and mount the generator onto the flange. It should be possible to orient the flange in any direction (north, south, east, and west) and also fix it in a specific direction on top of the mast.
- 6) Make the N marker on the generator point to the north and the S marker to the south. Fix the generator with brass or SUS nuts and bolts of 10 mm (3/8 in.). Be sure to install the generator so that the wind direction shaft (stand height) is vertical.

### 3. Cable and wire connections -- between the sensor and the indicator

- 1) Use 5-core shielded cable with 0.5 mm<sup>2</sup> or better
- 2) Usable cable diameter: 8.6 to 10.5 mm
- 3) Should be far away from high-tension or large-current circuits.
- 4) A portable lightning arrester is included in the product. If your region is prone to lightning or if a long cable is used, either add a lightning arrester near to the generator or use an underground cable.



There is a portable lightning arrester in the generator. Due to limited space, a large-capacity lightning arrester cannot be supplied. If your region is prone to lightning, it is recommended to install an external lightning arrester of a larger capacity.

### 4. Wire connections to the sensor



- 1) Connect the wires by referring to the wiring diagram.
- 2) To prevent rain water from entering the waterproof connector, make sure that the rubber packing is properly fixed and the connection to the sensor is firmly secured.
- 3) The grounding terminal is located outside the generator. Be sure to connect a heavy cable for grounding (E3).



“Do not forget to ground the circuit to prevent electric shock or to ensure stable operation of instrument.”

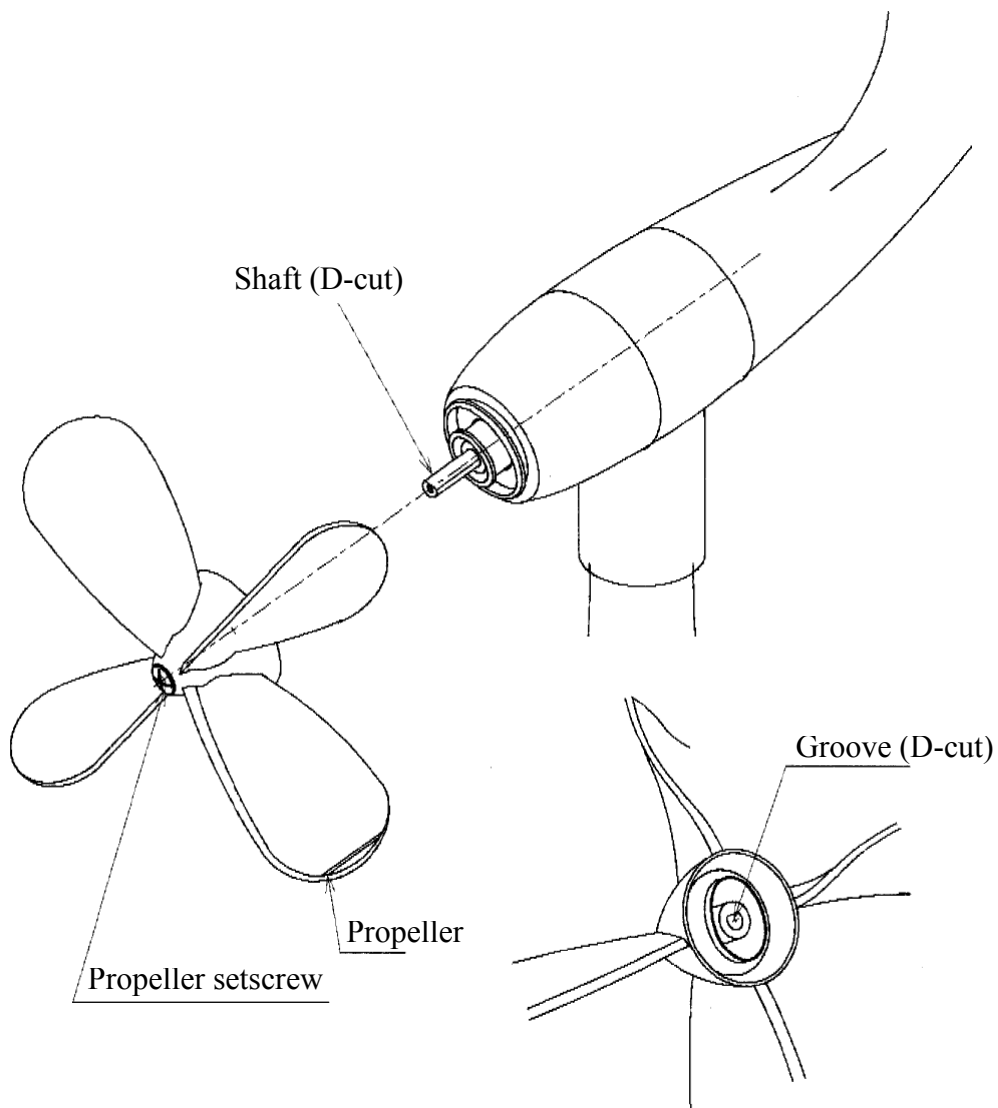
## IV. Maintenance

This instrument can be used without adding oil for a long period. An inspection should be performed at least once a year as follows.

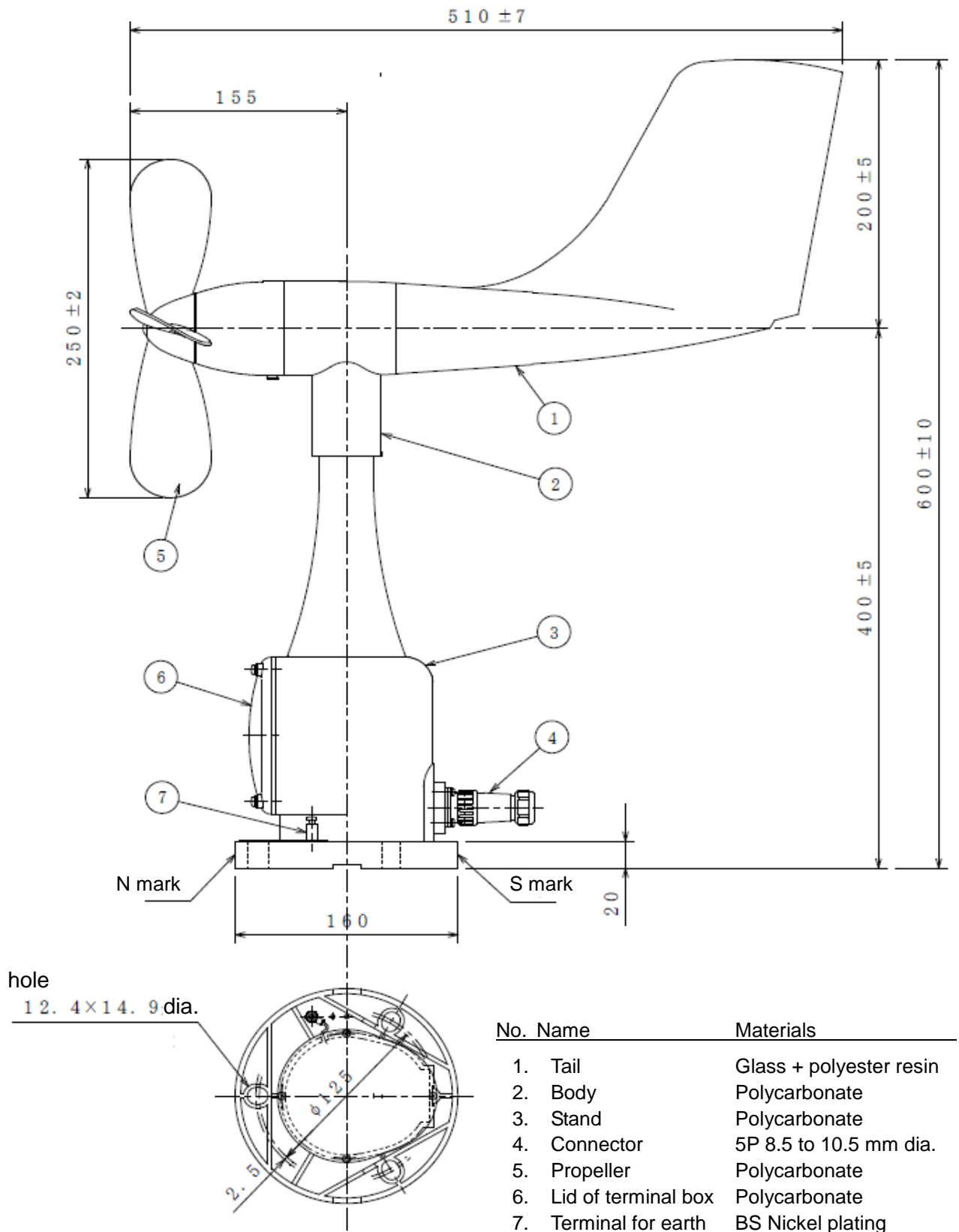
- 1) Check that the propeller and tail fin are smoothly turning when the wind speed is low (around 2 m/s). Or, check if they can smoothly turn and stop when manually moved. If the movement is not smooth, add oil or contact us for replacement of the ball bearing.
- 2) To maintain the accuracy, the instrument should be tested once every four or five years, or should be overhauled.

**How to install the propeller of Wind speed & direction Sensor**

- 1) Fit the propeller onto the propeller shaft by aligning the flat surface on the groove with the flat surface on the propeller shaft.
- 2) Push in the propeller until it stops, and then tighten the setscrew for the propeller with a screwdriver. Tightening torque: 14kg/cm to 18kg/cm
- 3) Use a screwdriver that has a grip of 24 mm dia. or more to ensure firm tightening. Screwdrivers of smaller grip size cannot generate enough tightening force.



**Rear view of Propeller**



Wire Diagram

Aero plane Type Wind Speed & Direction

