

# Gamesa Turbine: Hybrid™ XT Control Sensor Retrofit

ICEFREE3 NPN ANEMOMETER (3290) TO HYBRID XT PUSH/PULL OUTPUT TURBINE CONTROL SENSOR, ANEMOMETER (7901)  
 ICEFREE3 TWO-CHANNEL NPN YAW VANE (3292) TO HYBRID XT PUSH/PULL OUTPUT VANE (7894)

## Introduction

Instructions for replacing IceFree turbine control sensors with Hybrid XT sensors on Gamesa wind turbines are provided below. Users should be familiar with the operation of the Hybrid XT anemometer and vane prior to performing this retrofit.

Product manuals and instructions for retrofits on other turbines can be obtained by contacting Renewable NRG Systems at [info@renewablenrgsystems.com](mailto:info@renewablenrgsystems.com).



Always power the heater on your Hybrid XT sensor! Failure to maintain constant heating may lead to corrosion or inferior sensor performance. Constant heating prevents condensation from forming on the bearings, enabling the sensor to achieve a 10 year service cycle. **If the sensor is used without the heater, the warranty will be void.**



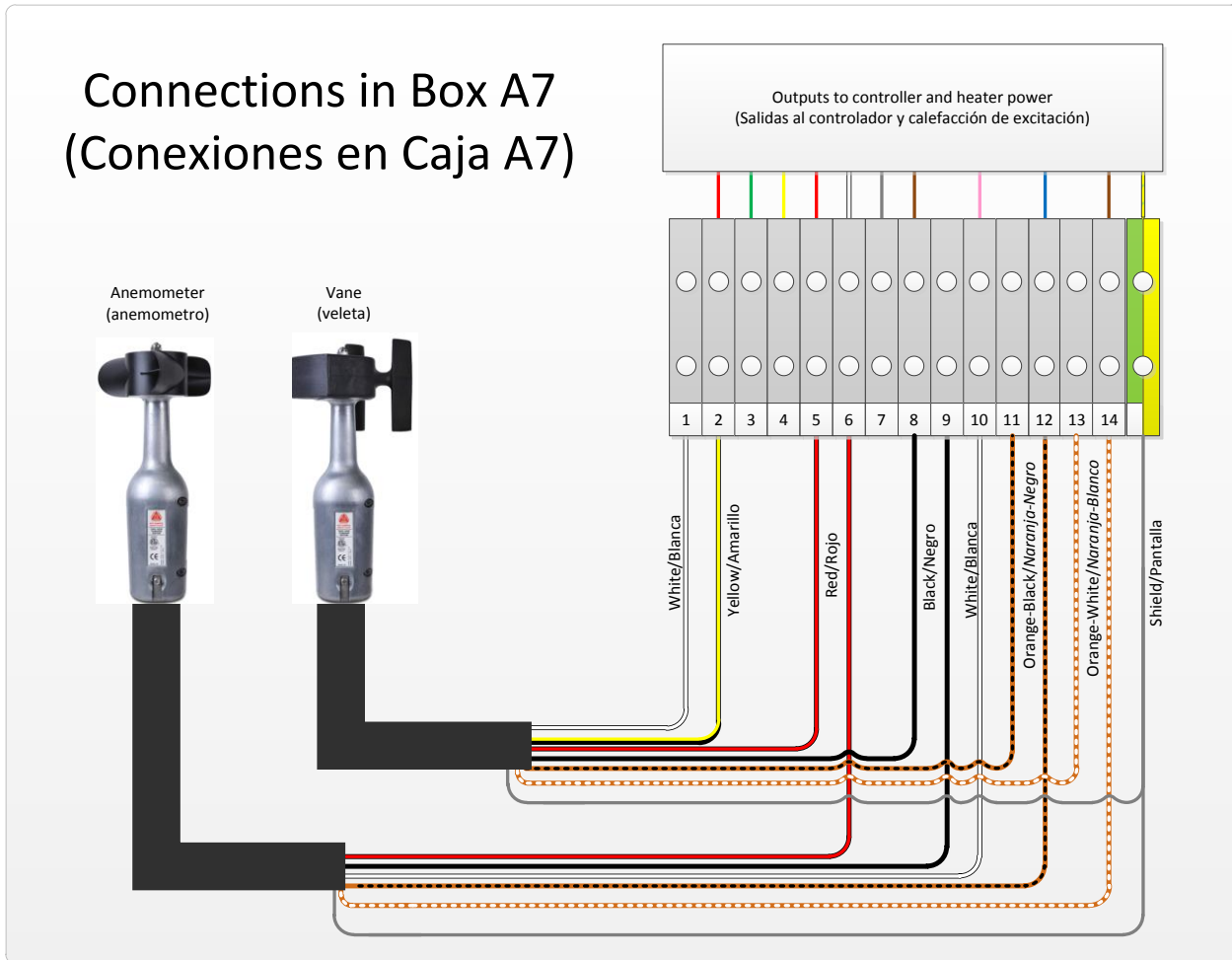
Sensor surfaces (particularly the head and the upper body) can become quite hot and may burn you; especially in warm ambient conditions. **Use caution when the heater power is on.**

## Wiring information

Table 1 Hybrid XT and IceFree3 equivalent wiring table

|            | Function    | IceFree3 Wiring | Hybrid XT Wiring | Gamesa Wiring   |
|------------|-------------|-----------------|------------------|-----------------|
| Anemometer | Excitation  | Red             | Red              | Pin 6 (V+)      |
|            | Signal      | White           | White            | Pin 10 (Signal) |
|            | Ground      | Black           | Black            | Pin 9 (V-)      |
|            | Heater +    | White           | Orange/White     | Pin 14 (Heater) |
|            | Heater -    | Black           | Orange/Black     | Pin 12 (Heater) |
|            | N/A         | -               | Yellow           | NOT CONNECTED   |
| Vane       | Excitation  | Red             | Red              | Pin 5 (V+)      |
|            | VL Signal   | Green           | White            | Pin 1 (VL)      |
|            | VR90 Signal | Orange          | Yellow           | Pin 2 (VR90)    |
|            | Ground      | Black           | Black            | Pin 8 (VG)      |
|            | Heater +    | White           | Orange/White     | Pin 11 (Heater) |
|            | Heater -    | Black           | Orange/Black     | Pin 13 (Heater) |

Table 2: Hybrid XT wiring diagram



## Installation instructions

### Required equipment:

1. 7901 Sensor- Hybrid XT Push-Pull Output Turbine Control Sensor, Anemometer
2. 7894 Sensor-Hybrid XT Push-Pull Output Turbine Control Sensor, Vane
3. 8356 IF3 to Direct Output Hybrid XT Retrofit Kit (Gamesa) \*\*Includes 120M cable and adapter stub (Qty 2 required)
4. Technician's tool kit:
  - a. 10 mm wrench
  - b. 13 mm wrench
  - c. Wire strippers
  - d. Small screw driver for terminal connections

## Procedure:

### Removing IceFree sensors

1. Turn off breakers to IceFree sensors (heater and sensor power).
2. **Note** IceFree connections in **PLC connection** columns above.
3. Disconnect IceFree sensors |
  1. IF unable to turn off breakers, disconnect sensor connections in this order:
    - i. Anemometer: first RED wire, then WHITE, SHIELD, then BLACK
    - ii. Vane: first RED wire, then ORANGE, GREEN, SHIELD, then BLACK
4. Remove IceFree sensors (13 mm wrench): **Do not cut cables.**

*Note: It is recommended to attach a piece of rope to the end of IceFree sensor cables when removing from nacelle. This will allow the Hybrid cable to be pulled back through the sensor mast.*

Table 3 Hybrid cable assembly with stub mast adaptor

### Installing Hybrid XT sensors

5. Install the stub adaptors on the cable assemblies
  1. Key slot on connector opposite mounting slot on stub adaptor
  2. Create opening in shielding braid and insert ground screw
  - 3.
6. Install the stub adaptors on the sensor mast (13 mm wrench).
  1. Vane is on left, anemometer on right (see below)
  2. Label each cable as vane or anemometer – *Hybrid Cables are otherwise identical.*
  3. Feed Hybrid cable assemblies into nacelle to sensor connection terminals *\* Route cables away from generator.*
7. Install Hybrid sensors (10 mm wrench). Note "THIS SIDE TOWARD ROTOR" label showing.
8. Cut excess cable allowing for a drip loop and length to maneuver to make connections.
9. Strip tail end of cable ~20 cm; strip wire ends ~5 mm.
10. Connect cable wires to PLC per the noted wiring above. If connecting with power on, connect RED wire **last** for each sensor.
11. Turn on breakers to Hybrid XT sensors (heater and sensor power).
12. Verify signals to PLC.

