



SUMMARY

Instructions for the removal of the IceFree3 and installation of the Hybrid XT sensor for GE 1.5 SLE turbines are provided below. Users should be familiar with the operation of the Hybrid XT anemometer, Hybrid XT vane and Hybrid Personality Module prior to performing this retrofit.

Product manuals and instructions for retrofits on other turbines can be obtained by contacting Sales at NRG Systems: info@nrgsystems.com.

These instructions allow for the option of installation with or without the original IceFree interface board installed (TVS board). The Hybrid XT's Personality Module (PM) can be programmed to condition the output of the sensor to emulate either the original IceFree sensor, or the output of the TVS board depending on which outputs are used. These instructions detail how to perform the retrofit both with the removal of the TVS board and without.

WARNING AND NOTICES

NOTICE

Always power the heater on your HXT 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.**



WARNING

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.***

GROUNDING AND MOUNTING CONSIDERATIONS

To minimize sensor noise, the following are recommended:

- 1) Ground the cable shield to the sensor mast.
- 2) Remove the cable shield at the PM.
- 3) Mount the PM enclosure box to the side of the Top Box in the nacelle, rather than to the side of the generator.
- 4) Re-route the Top Box cables away from the generator and generator output cables.



TOOLS AND MATERIALS REQUIRED

Materials

- Hybrid XT Anemometer retrofit kit (NRG kit #5388)
- Hybrid XT Vane retrofit kit (NRG kit #5389)
- DIN rail, 6.5" long (16.5 cm)
 - * Assumes DIN rail will be mounted in TVS top box with TVS boards removed.
- Zip ties
- **If keeping the TVS board:** Wire to connect PM & board, Enclosure box for PMs

Tools

- 10 mm wrench
- 13 mm wrench
- Wire strippers
- Small flathead screwdriver
- Digital Voltmeter
- Tools necessary to mount DIN rail for PM (may vary by location and method)

PROCEDURE – REMOVAL OF THE TVS BOARD

Remove the IceFree sensors

1. Turn off heater and sensor power breakers to IceFree sensors.
2. Disconnect cables from TVS board.
3. Remove TVS board.
4. Mount DIN rail in TVS junction box using desired method.
5. Install PMs on DIN rail.
6. 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.



Installing the Hybrid XT sensors

7. Install the stub adaptors on the sensor mast (13 mm wrench).
8. Install the Hybrid XT cable assembly.
 - *Orient key notch toward rotor**
 - Label each cable, one for vane and one for anemometer.
 - Run the new sensor cables in the same place as the old IceFree3 cables. If a rope was used when the old cables were removed, attach end of Hybrid XT cable assembly and pull through.
 - Connect cable shield tail to Hybrid stub adaptor at the green screw.
 - Run Hybrid XT cable assembly back inside nacelle to PM location.
 - *Route cables away from generator**
9. Install Hybrid XT sensors (10 mm wrench).
10. Connect power wires to Personality Modules. Specified voltage is below.
 - *Connector details can also be found in the PM Manual.**
 - 24V DC is required to power the sensors’ electronics.
 - 24V AC is required to power the sensors’ heater.
11. Connect Hybrid XT sensor to Personality Module.
 - *Connector details can also be found in the PM Manual.**
 - Strip the outer jacket of cable back at least 6” to allow for easy wire clearance.

Personality Module		TVS Board Removed	
Sensor	Mode	Output Wiring	TVS Equivalent Output Wiring
Anemometer	A3	Pin #3	ANM1 (red)
		Pin #11 (GND)	GND (white)
		Pin #12 (12-24 VDC)	V+ (pink)
Vane	U8	Pin #1	YR (brown)
		Pin #2	YL (green)
		Pin #3	YR90 (yellow)
		Pin #4	YL90 (gray)
		Pin #11 (GND)	GND (black)
		Pin #12 (12-24 VDC)	V+ (pink)



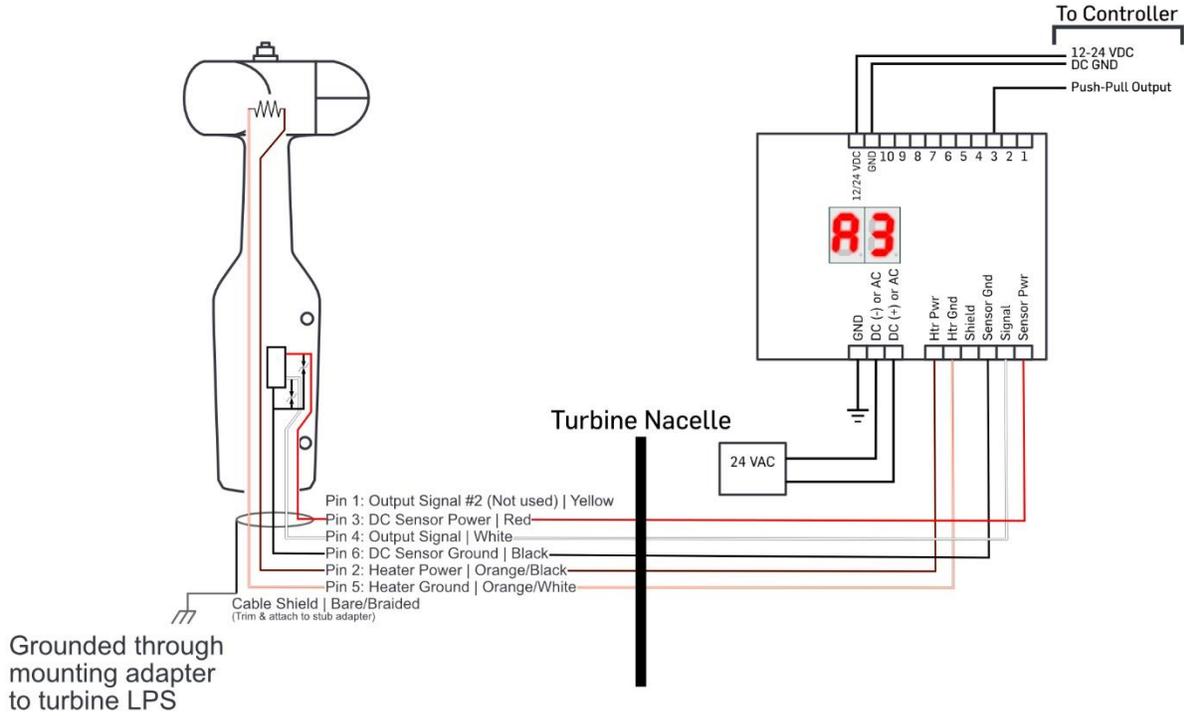
Programming the PM

12. Set the sensor mode on each PM as indicated below. To change, hold blue button down.
 - Vane > U8
 - Anemometer > A3
13. Connect outputs of Personality Modules to PLC connections using the wiring that was previously connected to the TVS board.
14. Check PM display to verify operation.
 - PM for anemometer should register wind speed as a whole number.
 - PM for vane should show segment display corresponding to direction.

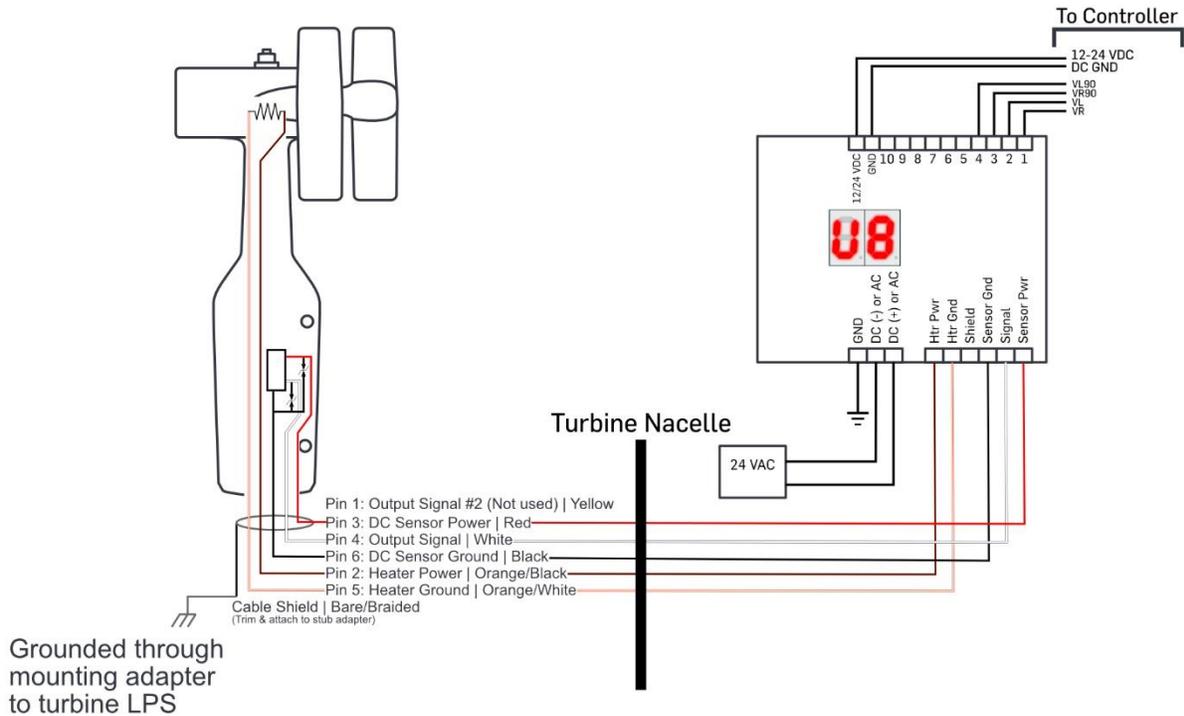
Wiring diagrams are found on the following page.



Anemometer Wiring Diagram | No TVS Board



Vane Wiring Diagram | No TVS Board





PROCEDURE – TVS BOARD INSTALLED

Performing this retrofit with the TVS board installed is similar to the procedure when removing the TVS board, with a few deviations. To prevent any missed steps during the retrofit, the entire procedure is listed below.

Remove the IceFree sensors

1. Remove power from TVS board using proper isolation methods.
2. Mount enclosure and DIN rails where appropriate & with sufficient clearances.
3. Install PMs on DIN rail.
4. Disconnect IceFree sensor connections from TVS board.
5. 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.

Installing the Hybrid XT sensors

6. Install the stub adaptors on the sensor mast (13 mm wrench).
7. Install the Hybrid XT cable assembly.
***Orient key notch toward rotor**
 - Label each cable, one for vane and one for anemometer.
 - Run the new sensor cables in the same place as the old IceFree3 cables. If a rope was used when the old cables were removed, attach end of Hybrid XT cable assembly and pull through.
 - Connect cable shield tail to Hybrid stub adaptor at the green screw.
 - Run Hybrid XT cable assembly back inside nacelle to PM location.
***Route cables away from generator**
8. Install Hybrid XT sensors (10 mm wrench).
9. Connect power wires to Personality Modules. Specified voltage is below.
***See PM manual for connector details.**
 - 24V DC is required to power the sensors electronics.
 - 24V AC is required to power the sensors heater.



10. Connect Hybrid XT sensor to Personality Module.

**See PM manual for connector details.*

- Strip the outer jacket of cable back at least 6" to allow for easy wire clearance.

Personality Module		TVS Board Removed	
Sensor	Mode	Output Wiring	TVS Board Input Wiring
Anemometer	A3	Pin #10	ANM1
		Pin #11 (GND)	ANM2
		Pin #12 (12-24 VDC)	V+
Vane	U8	Pin #1	YRE
		Pin #2	YLE
		Pin #3	YR90
		Pin #4	YL90
		Pin #11 (GND)	Vg
		Pin #12 (12-24 VDC)	V+

Programming the PM

11. Set the sensor mode on each PM as indicated below. To change, hold blue button down.

- Vane > U8
- Anemometer > A3

12. Connect outputs of Personality Modules to the TVS board.

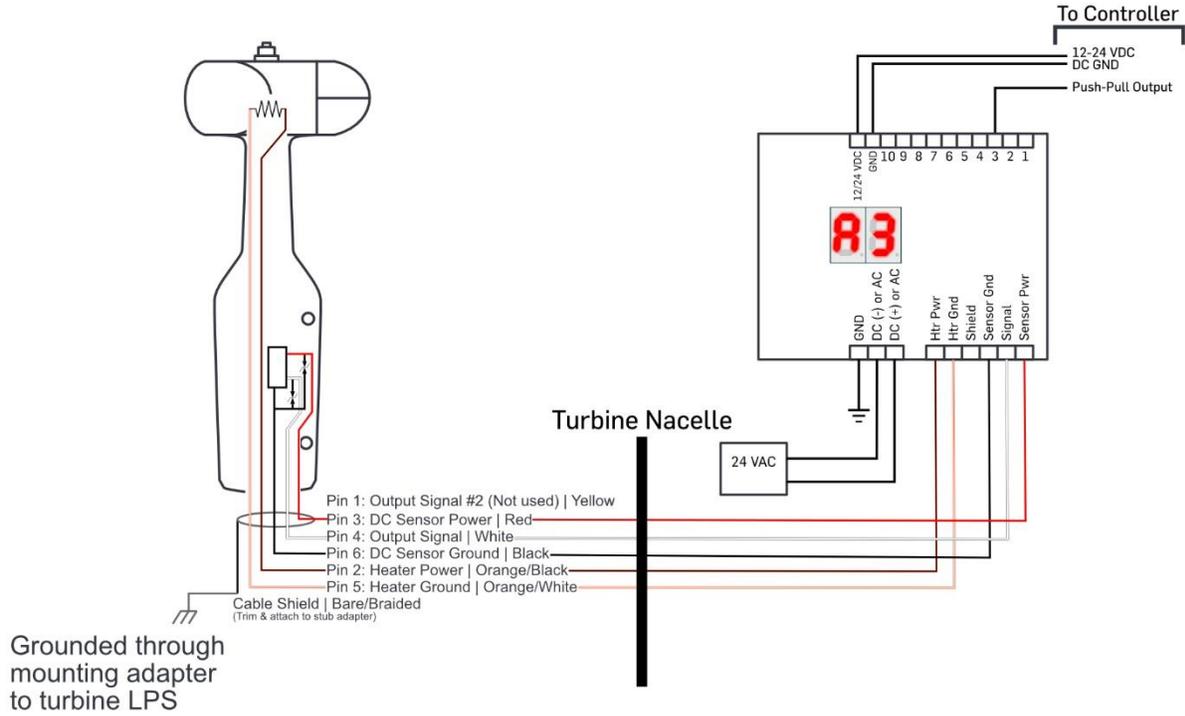
13. Check PM display to verify operation.

- PM for anemometer should register wind speed as a whole number.
- PM for vane should show segment display corresponding to direction.

Wiring diagrams are found on the following page.



Anemometer Wiring Diagram | TVS Board



Vane Wiring Diagram | TVS Board

