



Hybrid XT Turbine Control Sensor

System Overview
Renewable NRG Systems

Our Turbine Control Experience



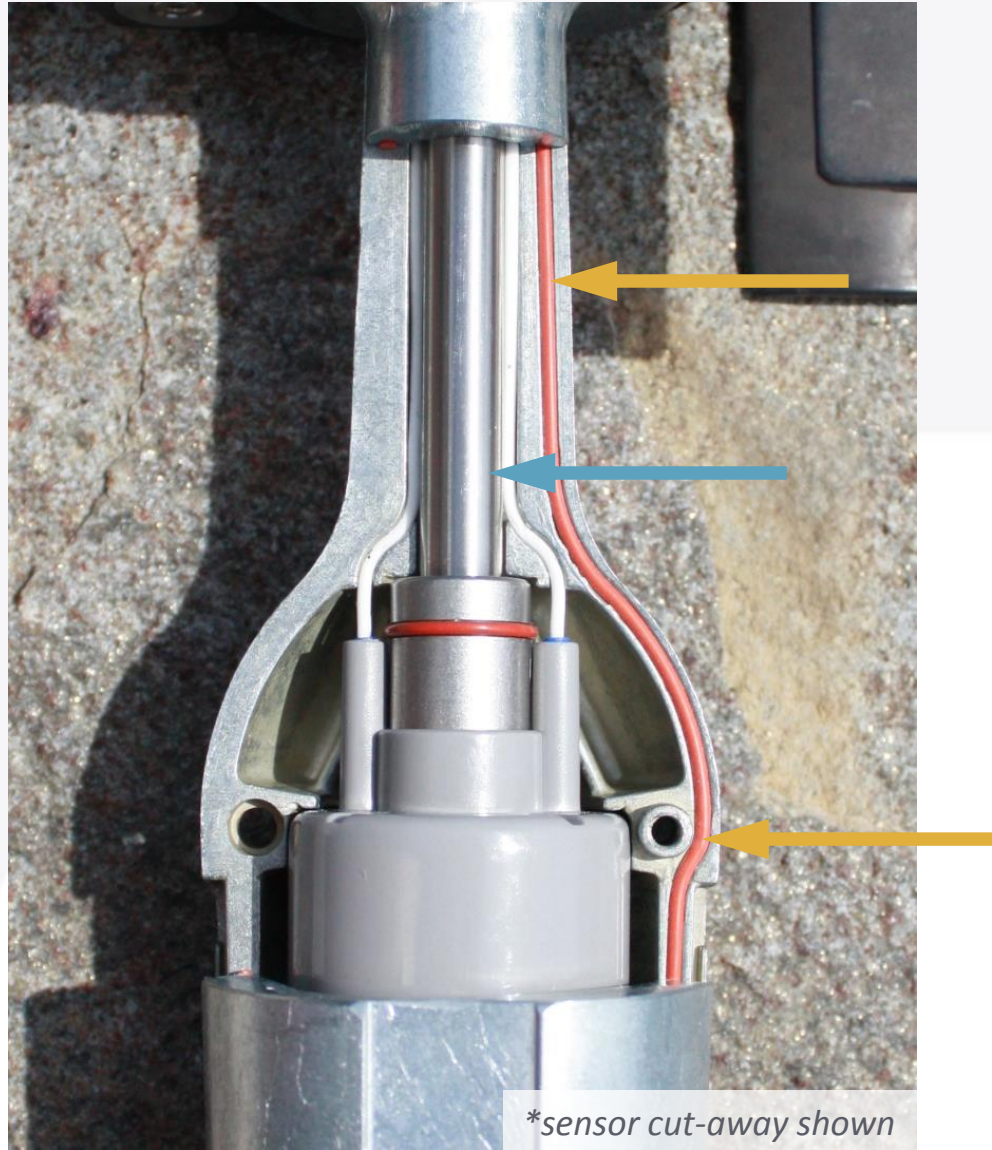
Over 20 years of turbine control sensor experience

Hybrid XT Features & Benefits

- Exceptional *reliability* extends sensor maintenance interval to 10 years
- Fully heated body and head provides superior *deicing performance* increasing your availability
- Innovative vane design provides unparalleled *wind tracking accuracy*

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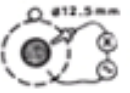




Hybrid XT Design - *Reliability*







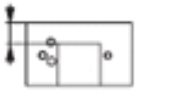



- Two-stage contamination protection reduces dust and dirt ingress (IP55)
 - Body and connector seals are the first stage
 - Cartridge bearing system is the second stage

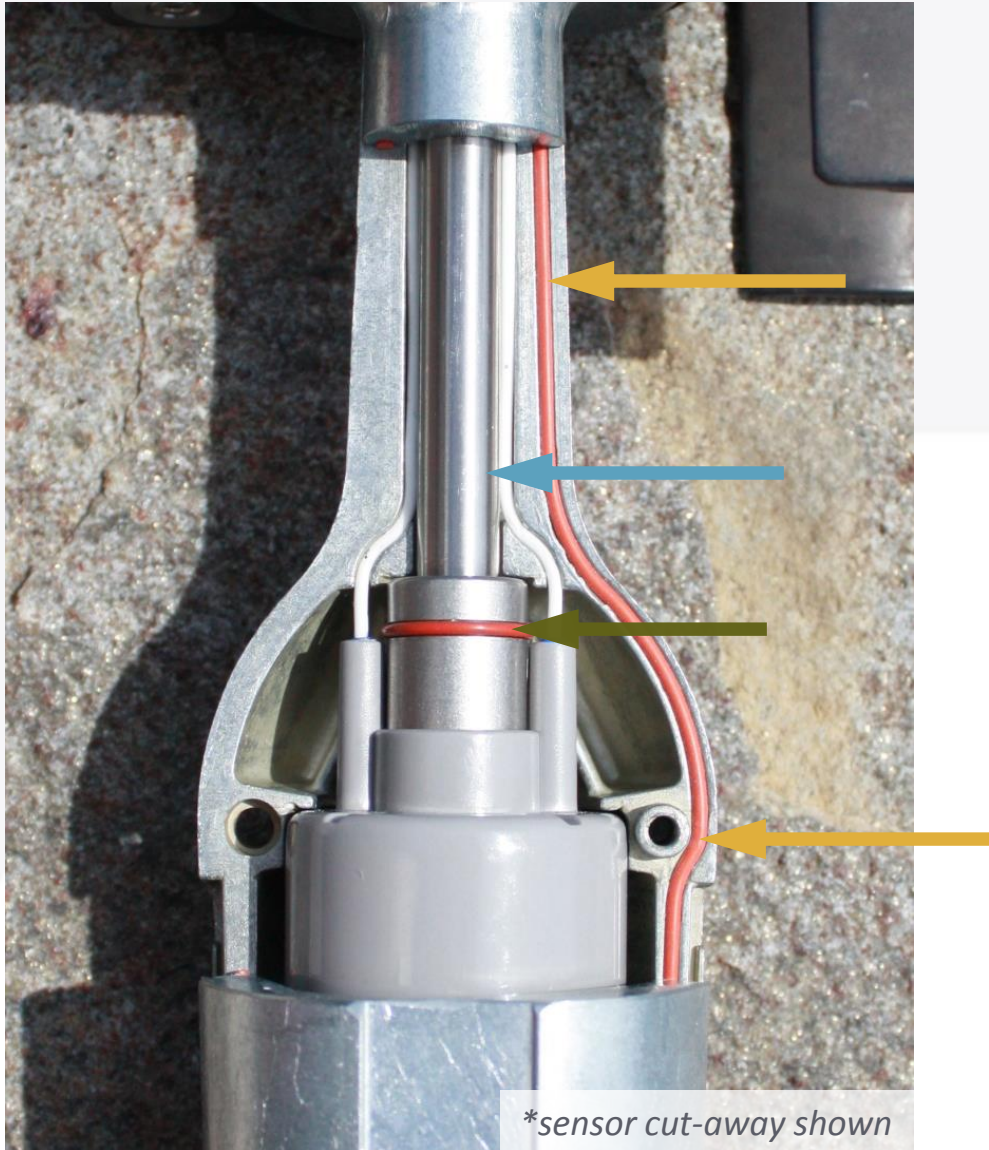
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Hybrid XT Design - Reliability

1st number : protection against ingress of solid objects		
IP	tests	
0		Non-protected
1		Protected against solid objects of 50 mm (1.968) and greater
2		Protected against solid objects of 12,5 mm (.492) and greater
3		Protected against solid objects of 2,5 mm (.098) and greater
4		Protected against solid objects of 1 mm (.039) and greater
5		Dust-protected (no harmful ingress)
6		Dust-tight (no ingress)

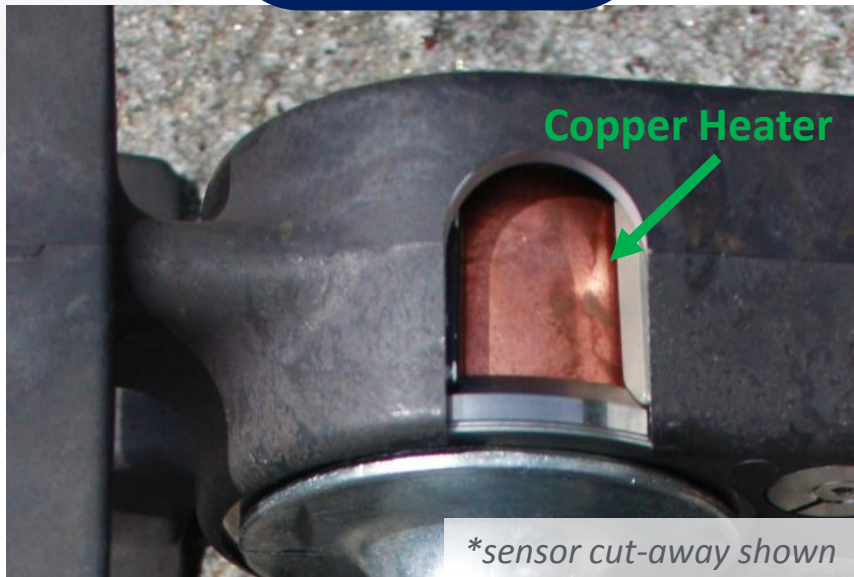
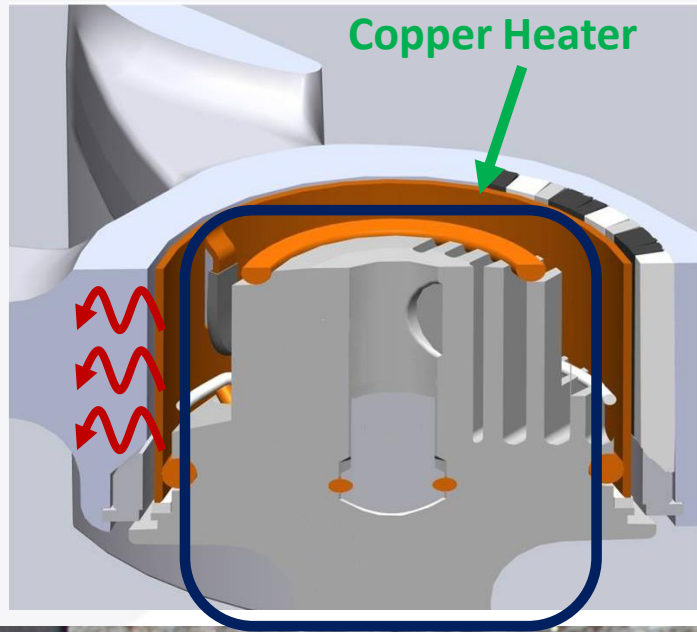
2nd number : protection against liquids		
IP	tests	
0		Non-protected
1		Protected against vertically falling water drops
2		Protected against vertically falling water drops when enclosure tilted up to 15°
3		Protected against water sprayed vertically at an angle up to 60°
4		Protected against splashing water
5		Protected against water jets from any direction
6		Protected against powerful water jets
7		Protected against the effects of temporary immersion in water
8		Protected against the effects of continuous immersion in water (depth x to be specified)

Hybrid XT Design - *Reliability*



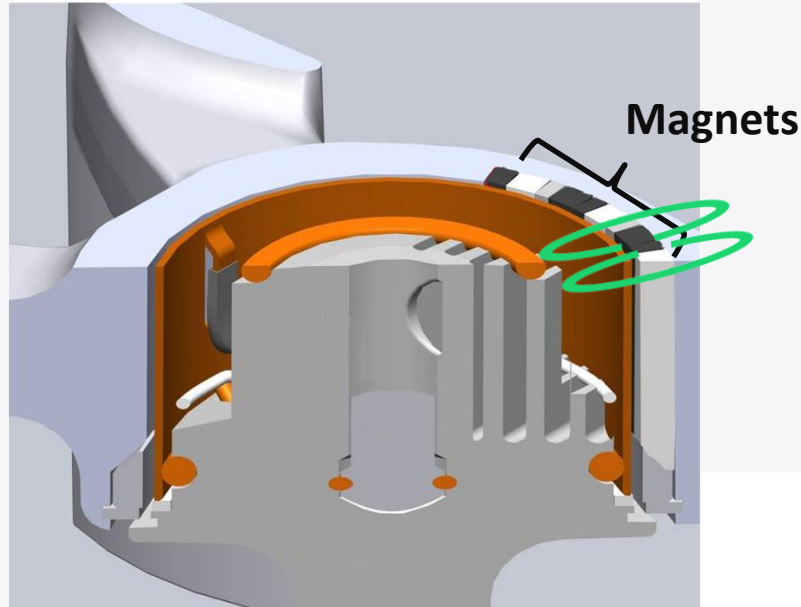
- Two-stage contamination protection reduces dust and dirt ingress (IP55)
 - Body and connector seals are the first stage
 - Cartridge bearing system is the second stage
- Shock-resistant cartridge mounting prevents bearing damage caused by rough handling
 - O-ring support each end of the cartridge bearing absorbing shocks and vibration

Hybrid XT Design - *Deicing Capability*

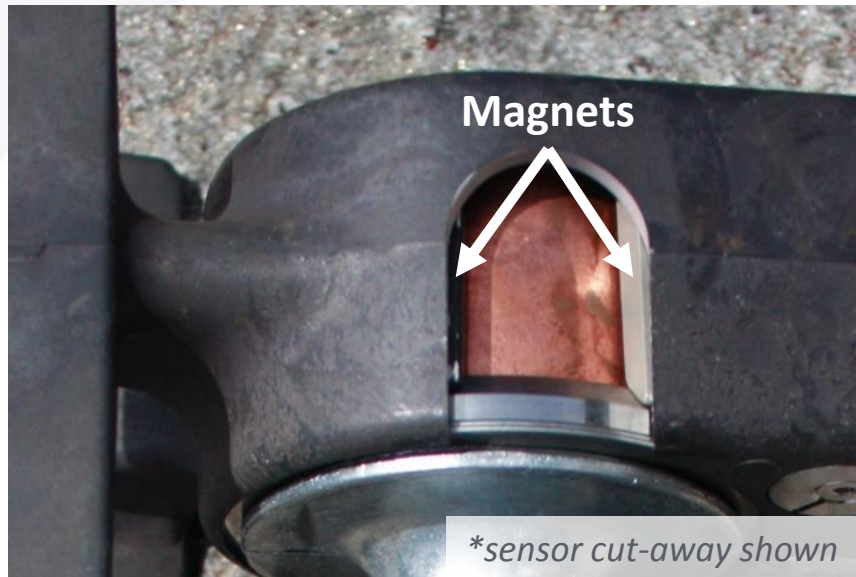


- Fully heated body and head provides superior anti-icing performance
 - Tight tolerance between copper heater and head allows for high heat flux
 - Zinc body allows for excellent heat transfer (8X more conductive than stainless steel)

Hybrid XT Design - *Tracking Accuracy*



- Patent-pending damping eliminates the tracking error caused by the turbulent flow of the rotor wash
 - Magnets in head create eddy currents in copper heater, damping *high speed* motion



Hybrid XT Retrofits

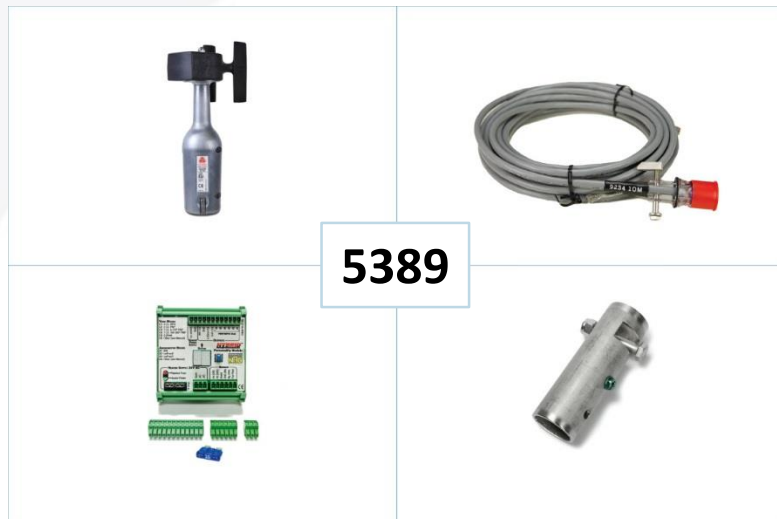
- **Solutions not just sensors**

- Easy installation with full documentation
- Onsite training available
- Lifetime technical support

Your Current Configuration:	You Need:	Anemometer Kit:	Vane Kit:	Power kit:
GE 1.5MW with IceFree3 sensors	→	5388	5389	N/A
Gamesa with IceFree3 sensors	→	8535	8599	N/A
Siemens 2.3MW with kk sensors	→	8535	8536	9375*
Mitsubishi with Nippon sensors	→	9373	9374	9376*
Mitsubishi with IceFree3 sensor	→	9371	9370	N/A

*one required per turbine

Hybrid XT Retrofits – GE 1.5MW



All the components required
to retrofit an IceFree3

Hybrid XT Retrofits – Gamesa



All the components required to retrofit an IceFree3

Hybrid XT Retrofits – *Siemens 2.3MW*



All the components required to retrofit unheated kk sensors

Hybrid XT Retrofits – *Mitsubishi*



All the components
required to retrofit an
IF3 anemometer and
NEI vane

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Hybrid XT Retrofits – *Mitsubishi*



All the components required to retrofit a NEI anemometer and NEI vane

Questions and Comments



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