

Restricted

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Specification of Yaw into Fixed Position due to Ice

V80-2.0MW, V90-2.0MW, V90-3.0MW,
V100-2.0MW / 2.2MW, V110-2.0 / 2.2MW,
V105 3.3MW / 3.45MW,
V112-3.0MW / 3.3MW / 3.45MW,
V117-3.3MW / 3.45MW,
V126-3.3MW / 3.45MW,
V136-3.45MW

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1 Introduction

This document describes the functionality for the feature: “yaw to fixed position due to ice”. The feature enables the turbine to yaw to a predefined position when a signal is received from the turbine ice detection system.

2 General Description

When the turbine ice detector signals the presence of ice, the turbine is set to pause. If the wind speed is below a 15m/s, the turbine is yawed into a predefined position. If the wind speed is above 15m/s, the turbine will keep tracking the wind i.e. not necessary yaw to the predefined position.

The system can be configured to resume normal operation in one of two ways:

1. Automatic restart upon ‘ice free’ signal from the ice detection system.
2. Manual restart upon signal from the wind farm operator.

The wind farm operator should select an operational strategy that takes into account the risk of ice throw on the site and the performance of the turbine ice detector.

2.1 Settings

The following table presents parameters to be set on the turbine:

Parameter	Default value	Responsible
Predefined yaw position [°]	Individual from turbine to turbine	To be set by Operator
Automatic return to operation	Manual	To be set by Operator
Wind speed threshold	15 m/s	To be set by Vestas

2.2 Residual Risks

The system functionality described in this document may reduce the risk of ice throw in certain critical areas around the turbine. It has been supplied at the request of the wind farm operator. Vestas has not made any field testing to verify whether yawing into a fixed position upon ice detection provides improved protection from ice throw.

Vestas recommends that at a minimum, the below risks be considered when using this system:

- Risk that ice builds up on the blades without the ice detector detecting it. This would not cause the turbine to paused or yaw to the predefined position.

- If ice is detected, there is a risk that the act of stopping and yawing of the turbine may dislodge ice and cause it to fall.
- Given the height of the blades, ice falling from the turbine, even when in the predefined yaw position, may travel some distance before hitting the ground.
- If the wind speed goes above 15m/s, the turbine will face into the wind, regardless of the signal from the ice detector.
- If the turbine is disconnected from the grid, it will not yaw into the fixed position.

3 Disclaimer

Recipient acknowledges that this document is subject to change without notice and for recipient's informational purposes only and does not create or constitute a warranty, guarantee, promise, commitment, offer for sale or other representation by Vestas Wind System A/S and/or any of its affiliates (Vestas) whether express or implied, all of which are hereby expressly disclaimed by Vestas except to the extent expressly provided and agreed to by Vestas in a written contract with recipient.

The ice detector system may only be designed to detect, presence and/or conditions, of specific ice types. Recipient acknowledges that not all types of ice may be detected and mounted nacelle ice sensors only detect conditions and/or presence of ice on the area which the sensor is mounted.

Due to the significant residual risks in this system, Vestas cannot offer any warranty on its performance. Vestas has implemented the yawing control strategy at the Customer's request in accordance with the Customer's specification. Vestas makes no claim that yawing the turbine in such a way is an effective mitigation against the risk of ice throw.

The performance of the system is limited by the performance of the ice detector. If ice is not detected, the turbine will not yaw into the fixed position.