

AIRBUS HELICOPTERS: MONITORING GEARBOXES WITH HUMS ACCELEROMETERS



Airbus Helicopters needed highly robust, flight-certified accelerometers for permanent monitoring of gearboxes to be quickly designed and delivered.

CHALLENGE

For helicopters, one of the most dangerous possible scenarios – worse than engine failure – is gearbox failure. Quality vibration monitoring is needed to ensure gearbox health and predict failures, while absolute reliability is vital to eliminate false alerts that would lead to ditching. Under tough conditions, this requires robust resistance to mechanical, electrical and environmental influences.

SOLUTION

Brüel & Kjær designed health usage monitoring (HUMS) accelerometers for the EC 175. The hermetically sealed and double-shielded designs are immune to dust, humidity, low- and high-frequency electromagnetic interference, and ground loops.

Secure mounting is vital to maximize the reliable frequency range, so finite element modelling was used to define an optimized bracket while enabling close consultation with Airbus Helicopters throughout the design process.

The transducers are flight-certified, and face demanding production quality controls performed according to the DO160E standard. The units are pre-aged in Brüel & Kjær's unique proving process, and rigorously tested before shipment.

CONCLUSION

The accelerometers now perform long-term monitoring on all new EC 175 helicopters, and are retrofitted to the EC 225 Super Puma.

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Gearbox monitoring

Up to 15 of these single-axis units are mounted on the main and tail gearboxes, and along the powertrain.

They can detect bearing failure due to a high resonance frequency of 43 kHz. The practical centre-bolt mounting allows cable connection in any direction



Rotor monitoring

These tri-axial units provide data for rotor monitoring, balancing and pilot comfort