



Helicopter Gearbox Shake, Rattle and Roll



Rugged



Small Size,
Low Profile



Low
Weight



Technical
Support

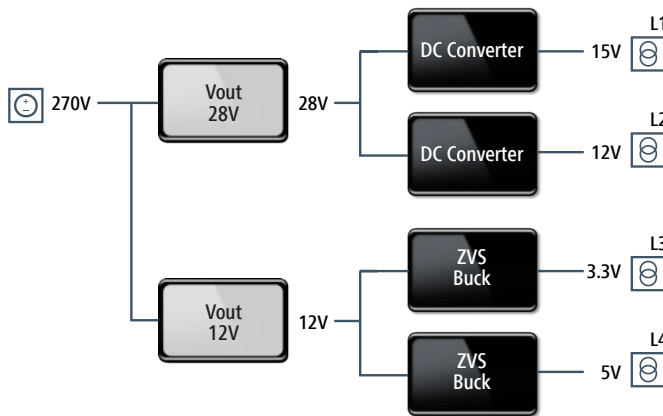
The Customer's Challenge

Helicopter transmissions are the most safety critical subsystems in a helicopter. In addition to size and weight, they must ensure the highest reliability under extreme operating conditions. Mechanical stresses in a main helicopter rotor, caused by vibration and centrifugal accelerations, pose hard constraints to the electronic components. A customer developing transmission controls also needed to ensure all the electronics satisfied the MIL and avionic standards for EMI and voltage transients.



The Solution

The local FAE team worked with the customer to develop the optimum solution. The generator of the helicopter produces a nominal voltage of 270 V_{DC} and one Brick Mini DC-DC converter generated a 12V rail to drive two ZVS Buck Regulators generating the auxiliary system voltages required by the control box. A second Brick Mini generated a 28V bus, driving two PI31xx Isolated DC-DC Converter Modules located remotely from the supply, next to the loads.



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The Results

The high frequency switching topologies of the Vicor converters resulted in smaller and lighter magnetics and capacitors and, therefore, less vibration stress and lower weight. Potting material further reduces the mechanical stress. Offering MIL-STD-810 compliant products Vicor enabled the customer to meet these requirements and guarantee highest reliability. Because of their small size, PI31xx isolated converters could be placed inside the transmission control boxes to be close to the loads.

New, even smaller and lighter products on Vicor's roadmap gave the customer the confidence that the current design has the capability for future upgrades.

Product Family Key Specifications

Maxi, Mini, Micro DC-DC Converters

Input Voltages	24V (18 – 36V), 28V (9 – 36V), 48V (36 – 75V), 72V (43 – 110V), 110V (66 – 154V), 150V (100 – 200V), 300V (180 – 375V), 375V (250 – 425V)
Output Voltage	2 – 54V _{DC}
Output Power	Up to 600W
Efficiency	Up to 87%
Dimensions	Full Brick : 117 x 55.9 x 12.7 mm Half Brick : 57.9 x 55.9 x 12.7 mm Quarter Brick: 57.9 x 36.8 x 12.7 mm

Cool-Power® ZVS Buck Regulator Module

Input Voltages	12V, 24V, 48V (Nominal)
Output Voltage	Wide output range (1 – 16V)
Output Current	8A, 9A, 10A, and 15A versions
Efficiency	Up to 96.5% Light load and full load High efficiency performance
Dimensions	LGA SiP: 10 x 14 x 2.56 mm LGA SiP: 10 x 10 x 2.56 mm

PI31xx Isolated DC-DC Converter Modules

Input Voltages	48V (36 – 75V) Comms 28V (16 – 50V) M-Grade 24V (18 – 36V) Industrial
Output Voltages	3.3V, 5V, 12V, 15V, 18V
Output Power	50W / 60W (dependent on model)
Efficiency	Up to 87%
Dimensions	22 x 16.5 x 6.7 mm