

SYNCHRO-SYM versus MAGNIX Magni250

[SYNCHRO-SYM Designed To Meet MAGNIX Maximum Load RPM With the same Continuous Torque and Power]

	SYNCHRO-SYM	MAGNIX Magni250
<p>The green design compares BEM-CAD designed and MOTORPRINTER manufactured SYNCHRO-SYM to the MAGNIX designed and manufactured in accordance to Magni250 specification, which clearly shows SYNCHRO-SYM is up to half the cost, half the size, and half the loss as MAGNIX <i>for a given unit of power rating with up to 8x peak torque</i> for take-off and landing but <i>unlike MAGNIX, SYNCHRO-SYM specification always includes the loss, cost, and size of the tightly integrated BRTEC</i>. With active winding sets on rotor and stator, respectively, SYNCHRO-SYM provides failsafe operation with continuous operation during catastrophic failure of the either the rotor or stator winding set. SYNCHRO-SYM has no delicate permanent magnets, back EMF safety, or Cogging issues. <i>If coaxially stacked (1120 KW), SYNCHRO-SYM can provide gearless axles that drive contra-rotating propellers with twice the redundancy.</i></p>		
	[INCLUDES BRTEC & Up to 8x PEAK TORQUE]	[DOES NOT INCLUDE Electronic Control - MOTOR ONLY]
Continuous Power	280 KW / 375 HP @ 1900 RPM, 800V @ 1407 Nm Torque @ 93.9% Motor Efficiency @ 92.9% System Efficiency # @ 1.25T Airgap Flux Density @ 0.5 mm Air-gap @ 7 pole-pairs No RE-PM	280 KW / 375 HP @ 1900 MAX Load RPM, 540 V @ 1407 Nm Torque @ 93% Motor Efficiency @ Est. 89% System Efficiency with 96% Efficient Electronic Control # @ ? Airgap Flux Density @ ? Air-gap @ ? pole-pairs RE-PM Amount: ? Kg @ ?T
Diameter	460.8 mm #####	559 mm
Length	149.8 mm #####	279 mm
Weight	93.8 Kg #####	MAGNIX Estimated to be 71Kg?
Volume	24,968 cm ³ (W BRTEC & 280KW)	68438 cm ³ (WO electronic control & 280KW)
Continuous Power Density	11.2 KW/L (W BRTEC & 280KW)	4.1 KW/L (WO electronic control & 280KW)
Peak Power (2x)	560 KW / 750 HP ### @ 1900 RPM, 800V @ 2816.1 Nm Torque ### @ 86.8% System Efficiency # (W BRTEC & 560KW)	N.A.
Power Density (2x)	22.4 KW/L (W BRTEC & 560KW)	N.A.
Peak Power (4x)	1120 KW / 3001 HP ###	N.A.

	@ 1900 RPM, 800V @ 5631.9 Nm Torque ### @ 74.6% System Efficiency # (W BRTEC & 1120KW)	
Power Density (2x)	44.9 KW/L (W BRTEC & 1120KW)	N.A.
Peak Power (8x)	Available w rated BRTEC & Robust Frame Assembly	N.A.

The yellow design compares SYNCHRO-SYM to the Magni250, both of which are BEM-CAD designed and MOTORPRINTER manufactured to the same optimizing material, winding, and packaging (including frame) techniques, which clearly shows SYNCHRO-SYM is up to half the cost, half the size, and half the loss for a given unit of power rating while providing up to 8x peak torque for take-off and landing. Both designs include their respective electronic controller tightly integrated into the frame assembly. Also, SYNCHRO-SYM has no delicate permanent magnets, back EMF safety, or Cogging issues. If coaxially stacked (1120 KW), SYNCHRO-SYM can provide gearless axles that drive contra-rotating propellers with twice the redundancy.

	[INCLUDES BRTEC & Up to 8x PEAK TORQUE]	[INCLUDES Electronic Control]
Continuous Power	280 KW / 375 HP @ 1900 RPM, 800V @ 1407 Nm Torque @ 93.9% Motor Efficiency @ 92.9% System Efficiency # @ 1.25T Airgap Flux Density @ 0.5 mm Air-gap @ 7 pole-pairs No RE-PM	280 KW / 375 HP @ 950 MAX Load RPM, 800 V @ 1407 Nm Torque @ 93.9% Motor Efficiency @ 90.5% System Efficiency # @ 1.25 Airgap Flux Density @ 0.5 mm Air-gap @ 7 pole-pairs RE-PM Amount: 9.9 Kg @ 1.25T
Diameter	460.8 mm	460.8 mm ##
Length	149.8 mm	232.7 mm ##
Weight	93.8 Kg	91.3 Kg ###
Volume	24,968 cm ³ (W BRTEC & 280KW)	38,778 cm ³ (W electronic control & 280KW)
Continuous Power Density	11.2 KW/L (W BRTEC & 280KW)	7.4 KW/L (W electronic control & 280KW)

Note: SYNCHRO-SYM is non-optimized design: Only 10 design iterations.
 Note: SYNCHRO-SYM is the only brushless, symmetric multiphase wound-rotor “synchronous” doubly-fed electric machine system, as only provided by Brushless Real Time Emulation Control (BRTEC).
 Note: SYNCHRO-SYM requires the additional size cost and weight of a much more robust axle and frame assembly to meet the ultrahigh peak torque! Also, SYNCHRO-SYM electronic control (BRTEC) rating is designed to meet the indicated peak torque!
 Note: # System efficiency is the compounded product of electric motor and electronic controller efficiency.
 Note: ### The symmetrical or dual ported transformer circuit topology of SYNCHRO_SYM provides eight times the torque potential as the asymmetric transformer circuit topology. Electronic rating designed for indicated peak torque.
 ##### The size and weight of the axle and frame size and weight must meet the high peak torque demand