

pmsm_ipm_v_shape - Machine Report

Topology: PMSM
Generated: 2026-08-22 16:45:05 by Nabla

Operating point

Mechanical speed: 3000 RPM
Electrical frequency: 200.0 Hz
Simulated steps: 97 (field step 97)

All values are read from the selected completed simulation. Missing or non-finite quantities are shown as "-".

Machine Parameters

Operating Point

Parameter	Value	Unit	Comments
Mechanical Speed	3000.00	RPM	
Electrical Frequency	200.000	Hz	

DQ Quantities

Parameter	Value	Unit	Comments
D-axis Inductance (Ld)	1819.25	uH	
Q-axis Inductance (Lq)	4038.65	uH	
Saliency Ratio	0.450460	-	Ld/Lq

Flux and Voltage / Back-EMF

Parameter	Value	Unit	Comments
PM Flux Linkage 1st Harmonic Peak	0.114665	Wb	
Back-EMF 1st Harmonic Peak	149.400	V	peak of the fundamental
Back-EMF RMS	107.350	V	fundamental + harmonics
Back-EMF THD	18.0543	%	percent of the fundamental
Phase Voltage 1st Harmonic Peak	250.820	V	peak of the fundamental
Phase Voltage RMS	182.940	V	fundamental + harmonics

Torque and Mechanical Performance

Parameter	Value	Unit	Comments
Average Torque	45.9027	N.m	
Torque Ripple (Peak-to-Peak)	17.5932	N.m	
Torque Ripple	38.3271	%	percent of average torque
Cogging Torque (Peak-to-Peak)	0.326889	N.m	
Torque Constant (Kt)	1.06008	N.m/A	

Power and Efficiency

Parameter	Value	Unit	Comments
Apparent Power	18.8104	kVA	$S = V * I$ (RMS)
Active Power	15.2818	kW	$P = V * I * \cos(\phi)$
Reactive Power	10.9681	kVA	$Q = V * I * \sin(\phi)$
Mechanical Power	14.4207	kW	from average torque
Efficiency	94.1549	%	
Power Factor	0.812411	-	
Back-EMF Constant (Ke)	0.798385	V.s/rad	
Back-EMF Constant (Ke krpm)	83.6067	V/krpm	

Losses

Parameter	Value	Unit	Comments
Joule Losses (Winding)	866.782	W	
Current Density	7.41518	A/mm^2	
Phase Resistance	231.142	mOhm	

Parameter	Value	Unit	Comments
Slot Fill Factor	0.450000	-	
Iron Losses (Stator)	28.4570	W	
Iron Losses (Rotor)	0.00000	W	
Total Losses	895.239	W	

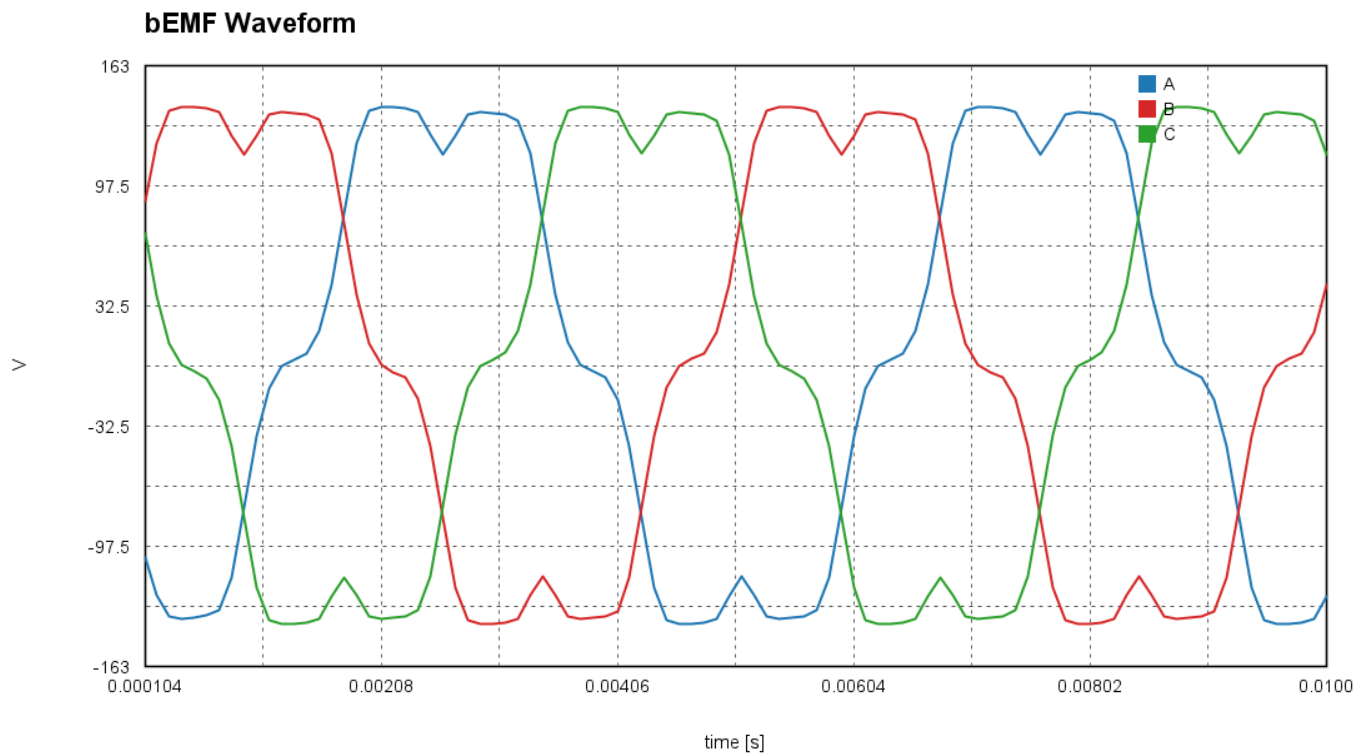
Flux Density Values

Parameter	Value	Unit	Comments
Max Flux Density (Stator Core)	1.32451	T	
Max Flux Density (Stator Tooth)	1.53134	T	
Max Flux Density (Rotor Core)	5.18123e-06	T	

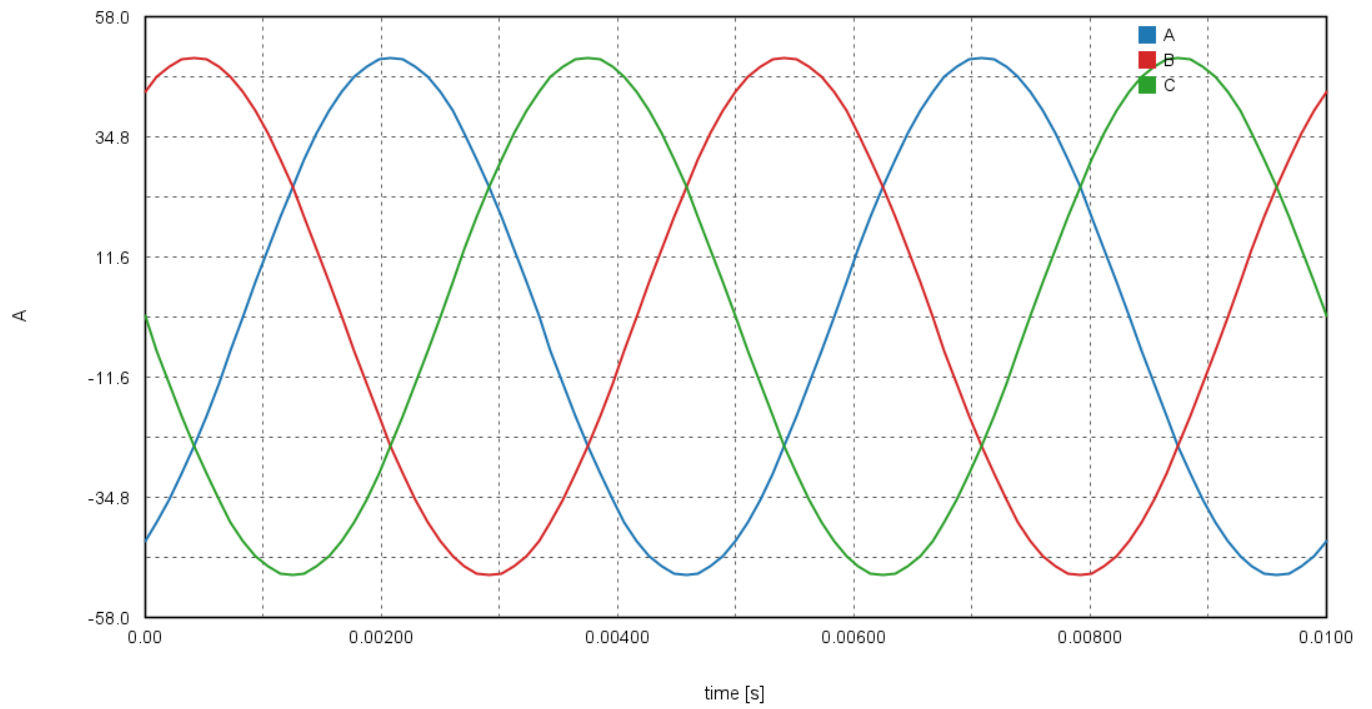
Mass Estimation

Parameter	Value	Unit	Comments
Stator Core Mass	6.16848	kg	area x axial length x density
Rotor Core Mass	0.00000	kg	
Winding Mass (In-Slot)	0.736780	kg	slot area x fill factor
End-Winding Mass	0.996931	kg	analytical, both axial ends
Magnet Mass	0.00000	kg	
Sleeves / Wedges / Spacers Mass	0.0139508	kg	
Total Mass	7.91614	kg	sector scaled to full machine

Key Waveforms

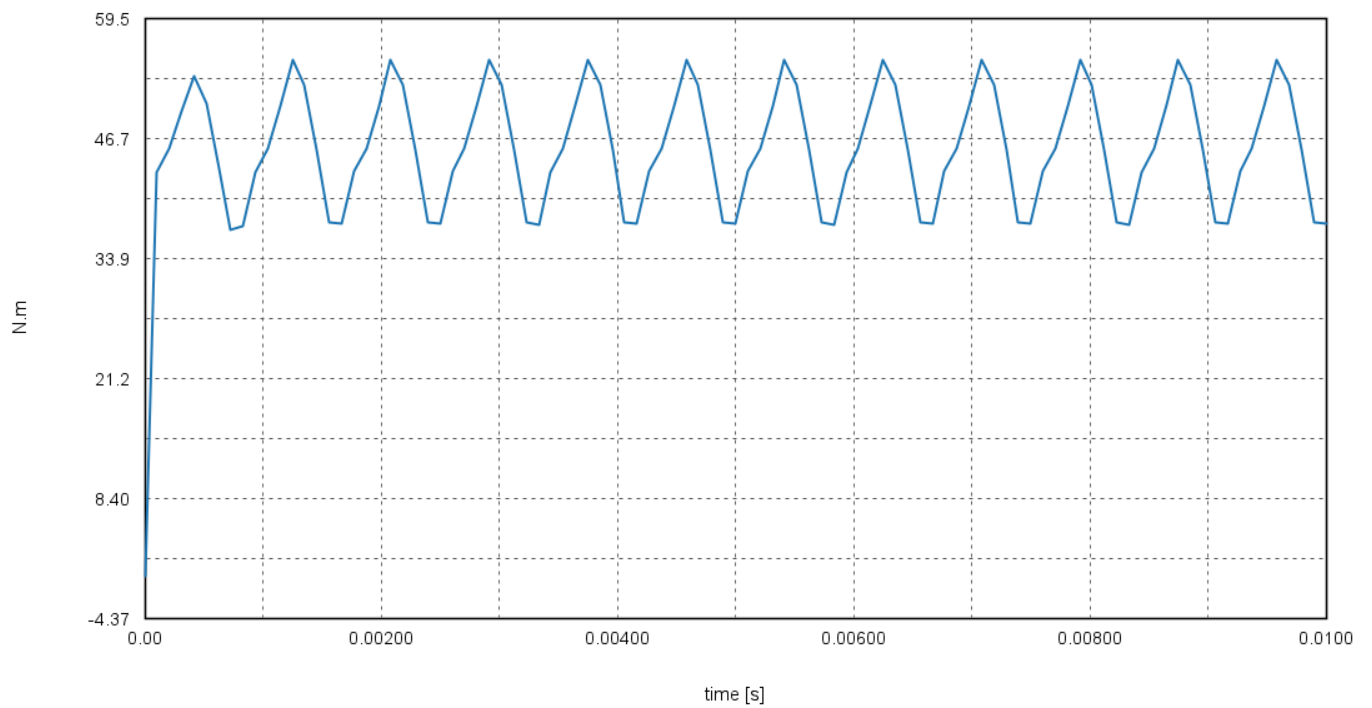


Phase Current



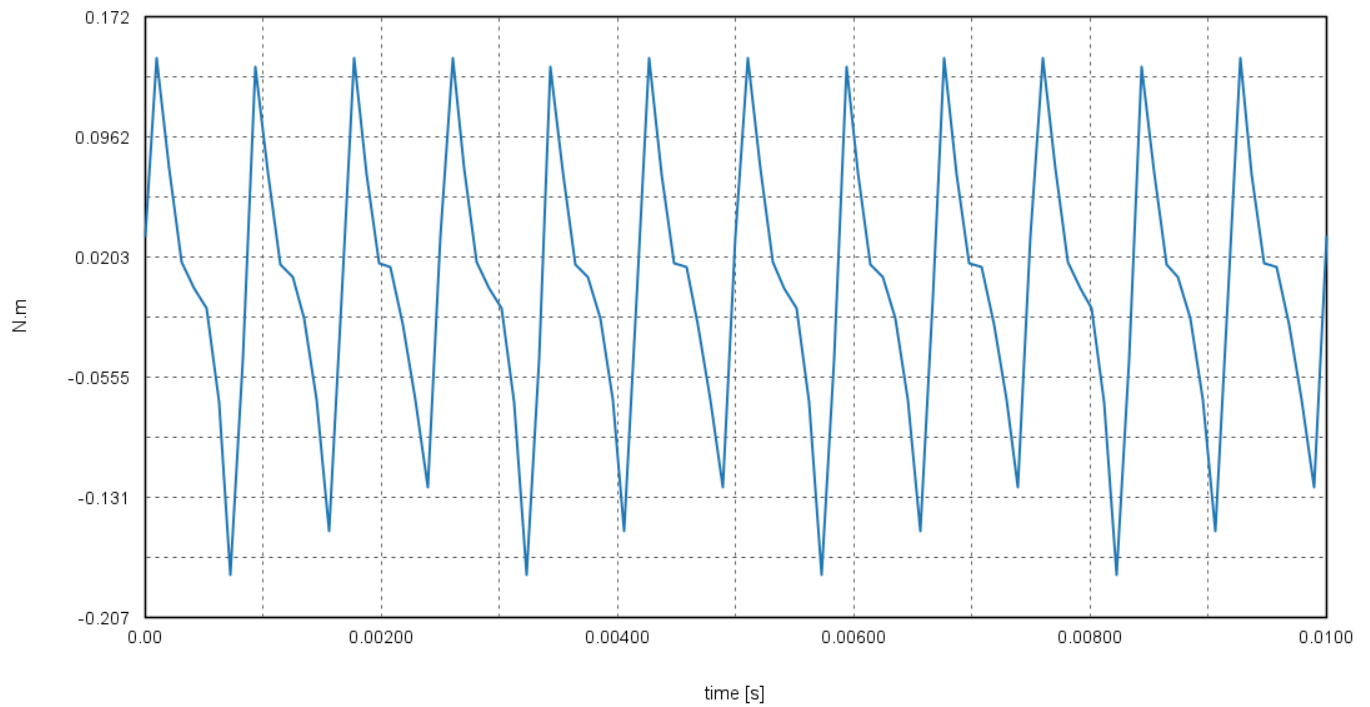
Full simulated range (97 samples). y-axis: A.

Torque



Full simulated range (97 samples). y-axis: N.m.

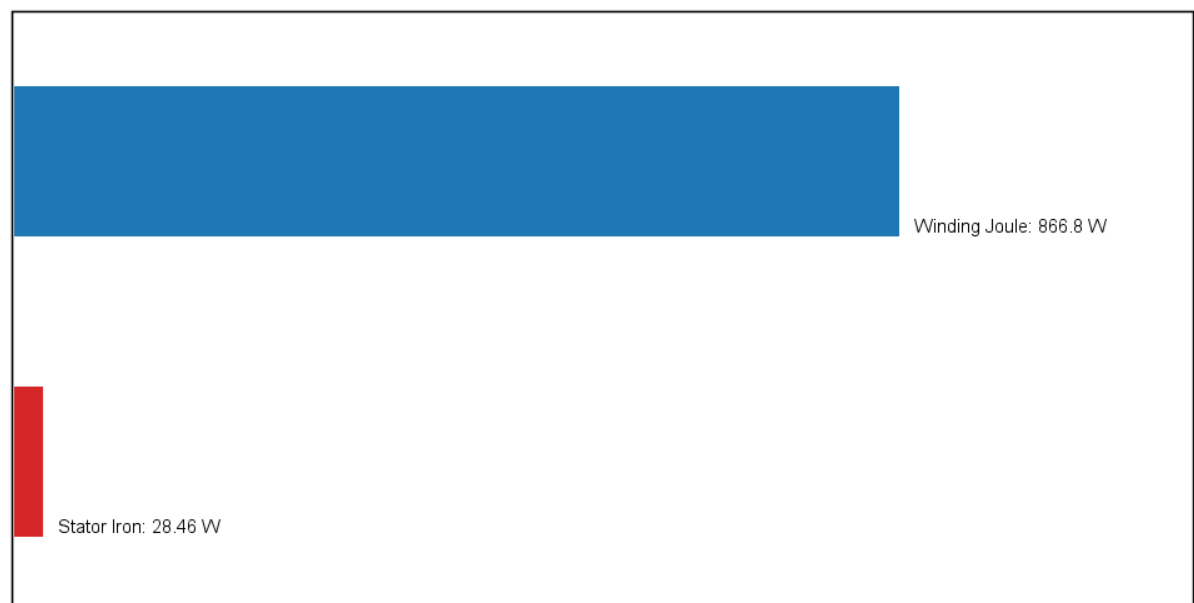
Cogging Torque



Loss Summary

Parameter	Value	Unit	Comments
Winding Joule	866.782	W	
Stator Iron	28.4570	W	
Total Losses	895.239	W	
Efficiency	94.1549	%	
Power Factor	0.812411	-	

Loss Breakdown



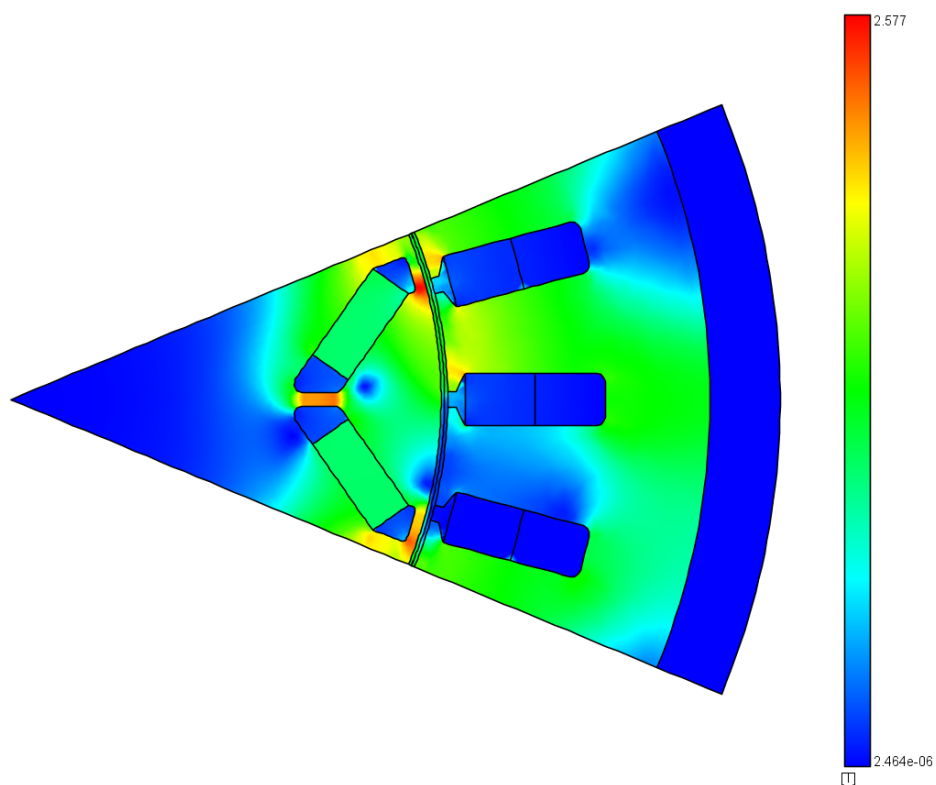
Total losses: 895.24 W

Performance Analysis

No performance-analysis items produced a result for this run.

Field Images

Flux Density Magnitude |B|



step 97/97 | t = 0.0100000 s | rotor position = 0.00 deg