pmsm_48s8p_segmented - Machine Report

Topology: PMSM
Generated: 2026-08-22 12:39:40 by Nabla

Operating point

Mechanical speed: 1500 RPM
Electrical frequency: 100.0 Hz
Simulated steps: 73 (field step 73)

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	1500.00	RPM	
Electrical Frequency	100.000	Hz	

DQ Quantities

Parameter	Value	Unit	Comments
D-axis Inductance (Ld)	71.3559	uH	
Q-axis Inductance (Lq)	100.954	uH	
Saliency Ratio	0.706813	-	Ld/Lq

Flux and Voltage / Back-EMF

Parameter	Value	Unit	Comments
PM Flux Linkage 1st Harmonic Peak	0.0639105	Wb	
Back-EMF 1st Harmonic Peak	40.1562	V	peak of the fundamental
Back-EMF RMS	28.3947	V	fundamental + harmonics
Back-EMF THD	0.00000	%	percent of the fundamental
Phase Voltage 1st Harmonic Peak	40.4774	V	peak of the fundamental
Phase Voltage RMS	28.6941	V	fundamental + harmonics

Torque and Mechanical Performance

Parameter	Value	Unit	Comments
Average Torque	22.6348	N.m	
Torque Ripple (Peak-to-Peak)	1.25696	N.m	
Torque Ripple	5.55323	%	percent of average torque
Cogging Torque (Peak-to-Peak)	0.00000	N.m	
Torque Constant (Kt)	0.377247	N.m/A	

Power and Efficiency

Parameter	Value	Unit	Comments
Apparent Power	3.64338	kVA	S = V * I (RMS)
Active Power	3.62809	kW	P = V * I * cos(phi)
Reactive Power	0.333457	kVA	Q = V * I * sin(phi)
Mechanical Power	3.55547	kW	from average torque
Efficiency	97.3991	%	
Power Factor	0.995803	-	
Back-EMF Constant (Ke)	0.257687	V.s/rad	
Back-EMF Constant (Ke krpm)	26.9849	V/krpm	

Losses

Parameter	Value	Unit	Comments
Joule Losses (Winding)	77.0096	W	
Current Density	1.51503	A/mm^2	
Phase Resistance	14.2610	mOhm	

Parameter	Value	Unit	Comments
Slot Fill Factor	0.450000	-	
Iron Losses (Stator)	17.9313	W	
Iron Losses (Rotor)	0.000935384	W	
Total Losses	94.9418	W	

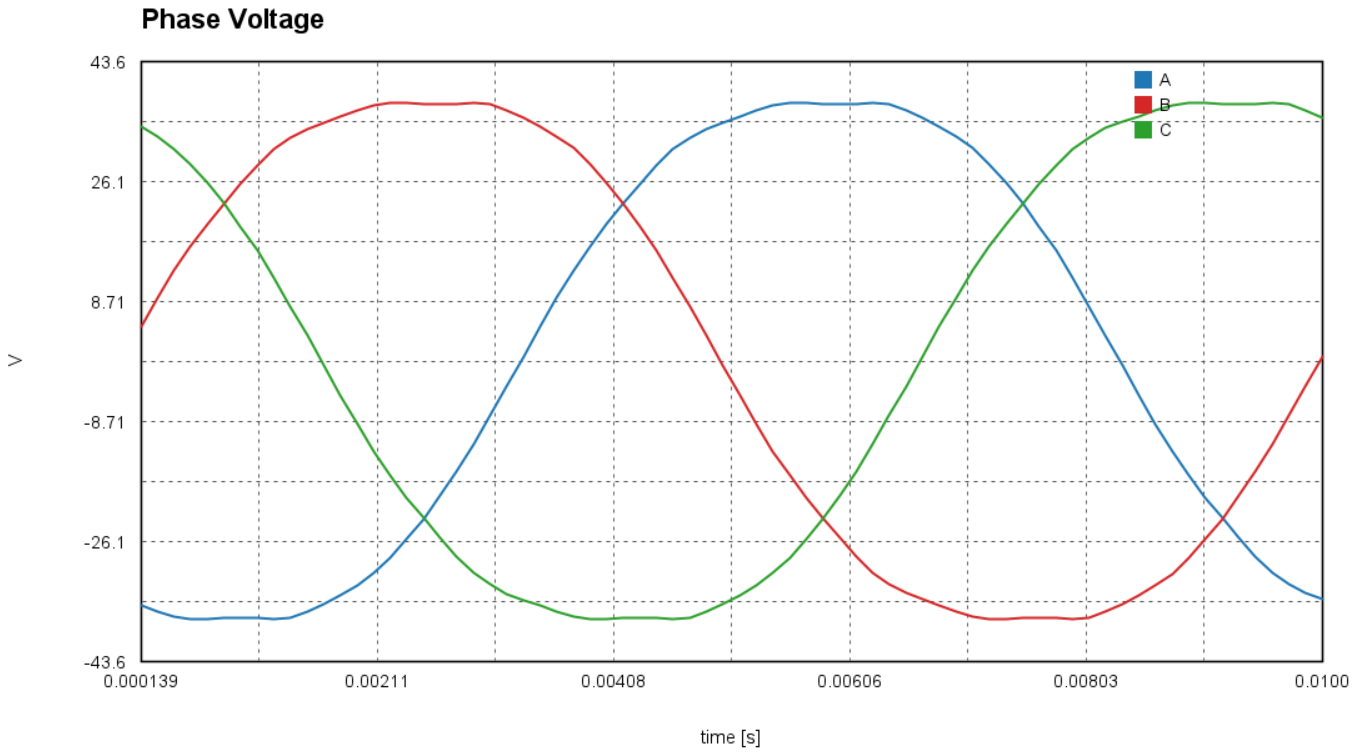
Flux Density Values

Parameter	Value	Unit	Comments
Max Flux Density (Stator Core)	1.50660	T	
Max Flux Density (Stator Tooth)	1.96484	T	
Max Flux Density (Rotor Core)	1.02999	T	

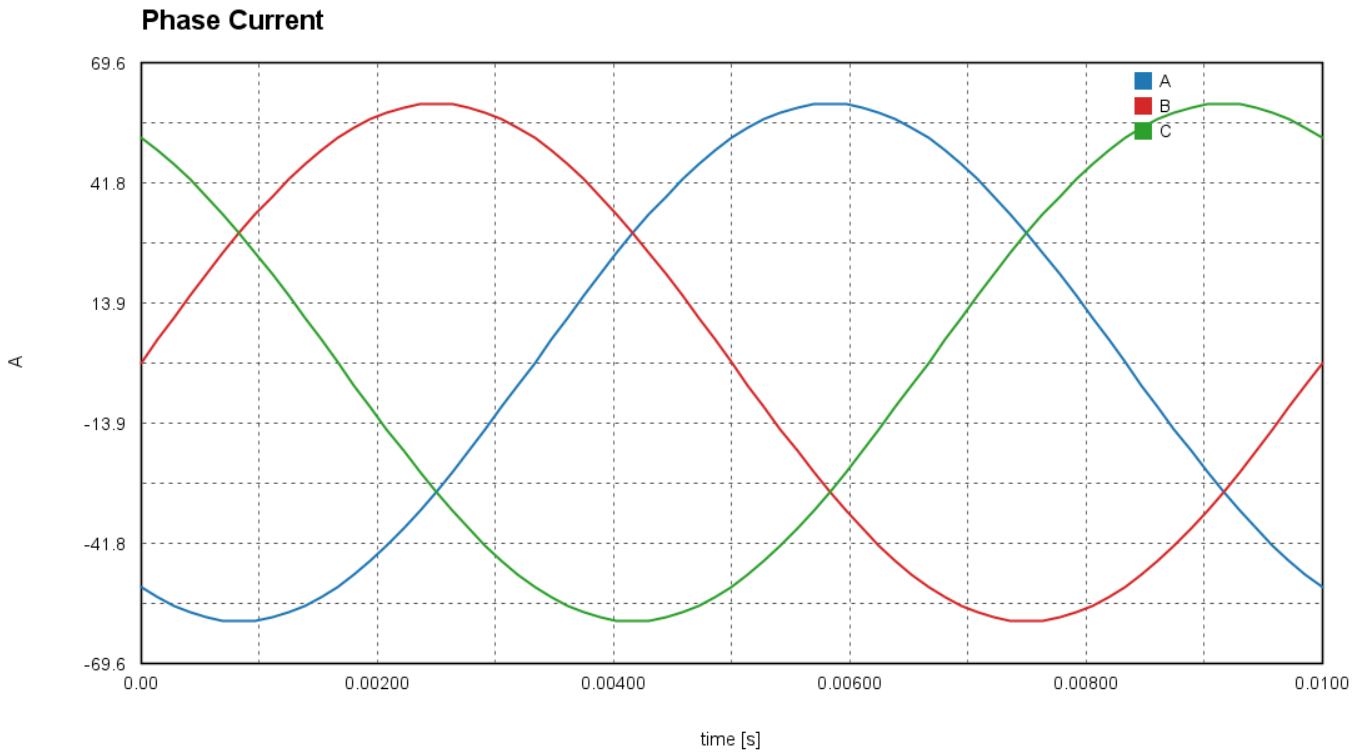
Mass Estimation

Parameter	Value	Unit	Comments
Stator Core Mass	6.25719	kg	area x axial length x density
Rotor Core Mass	1.54679	kg	
Winding Mass (In-Slot)	1.29975	kg	slot area x fill factor
End-Winding Mass	2.23654	kg	analytical, both axial ends
Magnet Mass	1.26674	kg	
Shaft Mass	3.55116	kg	
Sleeves / Wedges / Spacers Mass	0.0137849	kg	
Total Mass	16.1720	kg	sector scaled to full machine

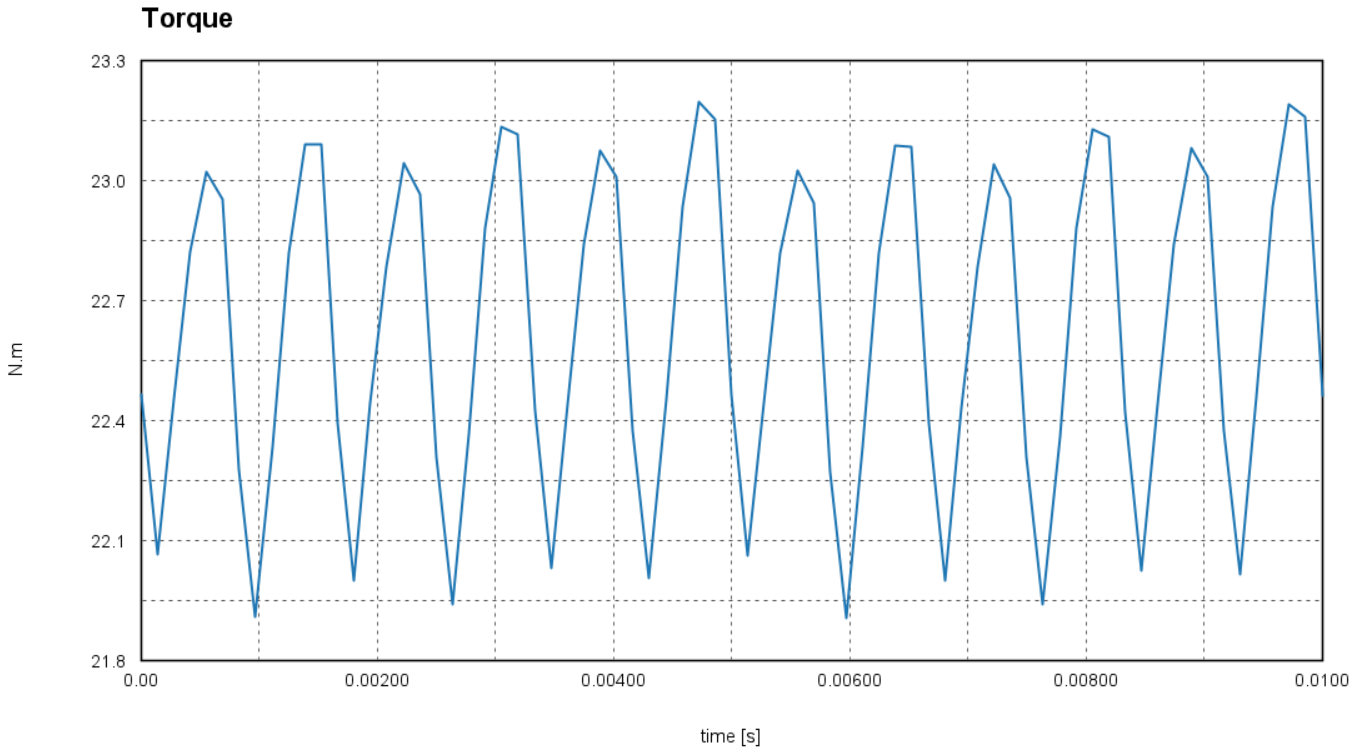
Key Waveforms



Full simulated range (72 samples). y-axis: V.



Full simulated range (73 samples). y-axis: A.



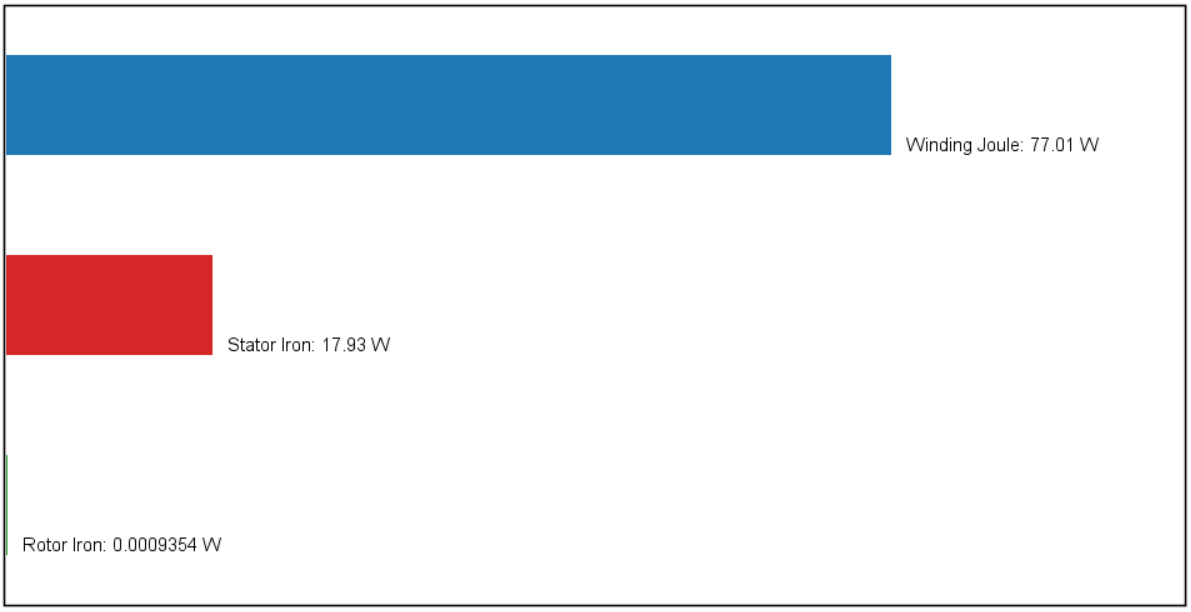
Full simulated range (73 samples). y-axis: N.m.

Loss Summary

Parameter	Value	Unit	Comments
Winding Joule	77.0096	W	
Stator Iron	17.9313	W	
Rotor Iron	0.000935384	W	
Total Losses	94.9418	W	
Efficiency	97.3991	%	

Parameter	Value	Unit	Comments
Power Factor	0.995803	-	

Loss Breakdown



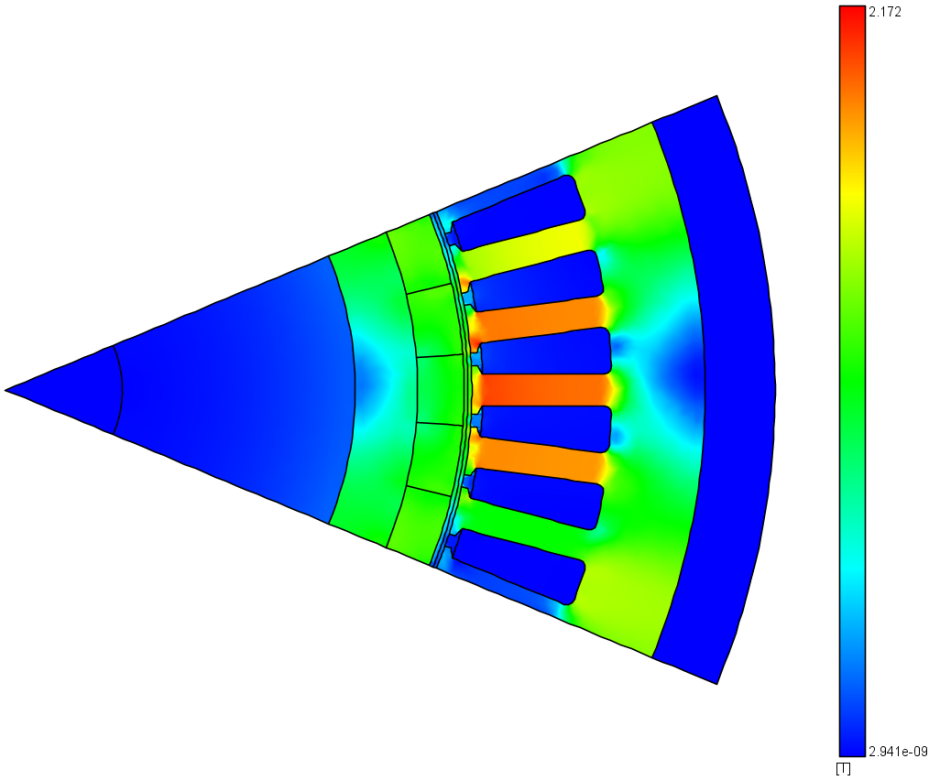
Total losses: 94.942 W

Performance Analysis

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

Field Images

Flux Density Magnitude |B|



step 73/73 | t = 0.0100000 s | rotor position = 0.00 deg