im_24s18r_trap_skew - Machine Report

Topology: IM
Generated: 2026-08-23 20:33:16 by Nabla

Operating point

Mechanical speed: 1425 RPM
Electrical frequency: 47.50 Hz
Slip: 0.05000
Simulated steps: 145 (field step 145)

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	1425.00	RPM	
Electrical Frequency	50.0000	Hz	
Slip	0.0500000	-	

Winding Quantities

Parameter	Value	Unit	Comments
Phase Inductance	43590.0	uH	
Phase Resistance	738.877	mOhm	

Flux and Voltage

Parameter	Value	Unit	Comments
Flux Linkage 1st Harmonic Peak	0.359321	Wb	
Phase Voltage 1st Harmonic Peak	118.632	V	peak of the fundamental
Phase Voltage RMS	84.3679	V	fundamental + harmonics

Torque and Mechanical Performance

Parameter	Value	Unit	Comments
Average Torque	10.6768	N.m	
Torque Constant (Kt)	0.00000	N.m/A	

Power and Efficiency

Parameter	Value	Unit	Comments
Apparent Power	3.57981	kVA	S = V * I (RMS)
Active Power	2.11025	kW	P = V * I * cos(phi)
Reactive Power	2.89170	kVA	Q = V * I * sin(phi)
Mechanical Power	1.59325	kW	from average torque
Efficiency	70.2378	%	
Power Factor	0.589485	-	

Losses

Parameter	Value	Unit	Comments
Joule Losses (Winding)	443.326	W	
Joule Losses (Rotor Bars)	212.962	W	
Current Density	5.55720	A/mm^2	
Slot Fill Factor	0.420000	-	
Iron Losses (Stator)	18.1778	W	
Iron Losses (Rotor)	0.649227	W	
Total Losses	675.115	W	

Flux Density Values

Parameter	Value	Unit	Comments
Max Flux Density (Stator Core)	1.82159	T	

Parameter	Value	Unit	Comments
Max Flux Density (Stator Tooth)	1.75398	T	
Max Flux Density (Rotor Core)	1.43357	T	
Max Flux Density (Rotor Tooth)	1.67172	T	

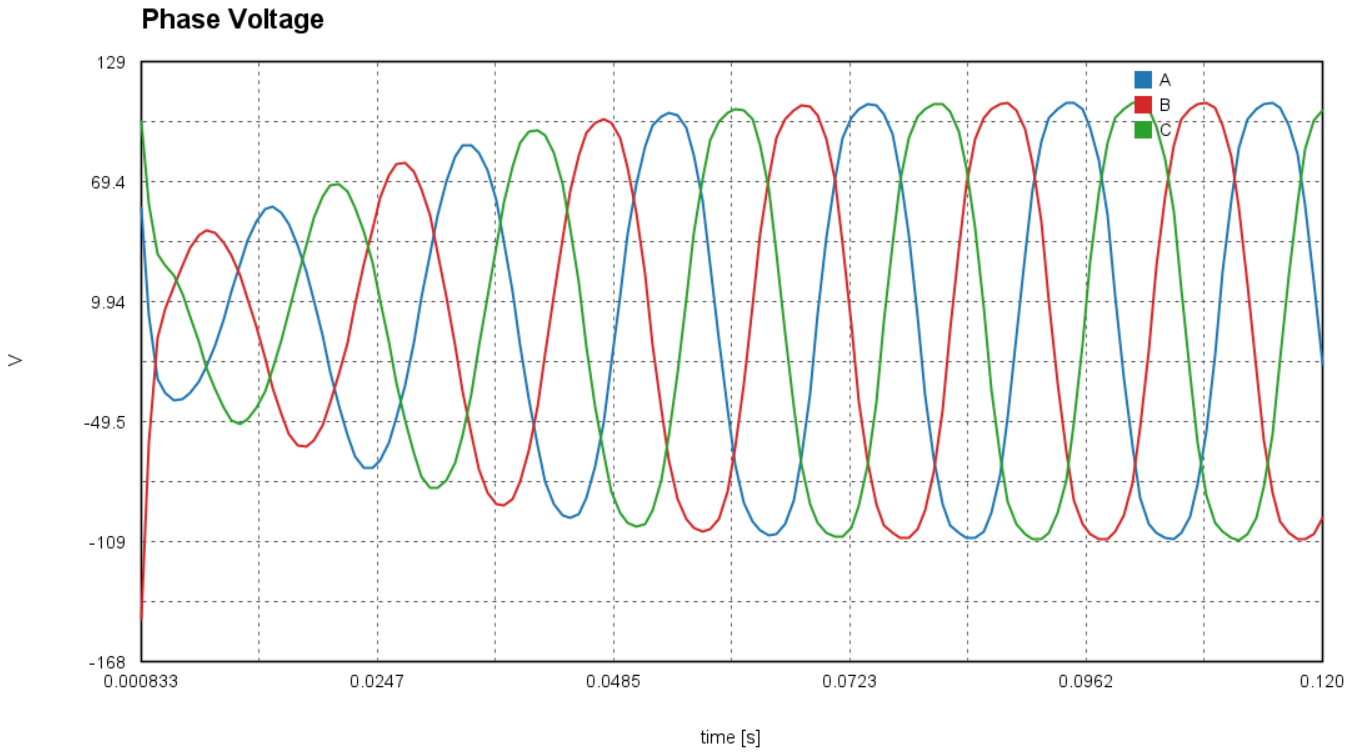
Mass Estimation

Parameter	Value	Unit	Comments
Stator Core Mass	4.21004	kg	area x axial length x density
Rotor Core Mass	1.81298	kg	
Winding Mass (In-Slot)	0.478684	kg	slot area x fill factor
End-Winding Mass	0.664960	kg	analytical, both axial ends
Rotor Cage Mass (Bars)	0.186562	kg	active bar length only
Shaft Mass	0.297113	kg	
Sleeves / Wedges / Spacers Mass	0.0116183	kg	
Total Mass	7.66196	kg	sector scaled to full machine

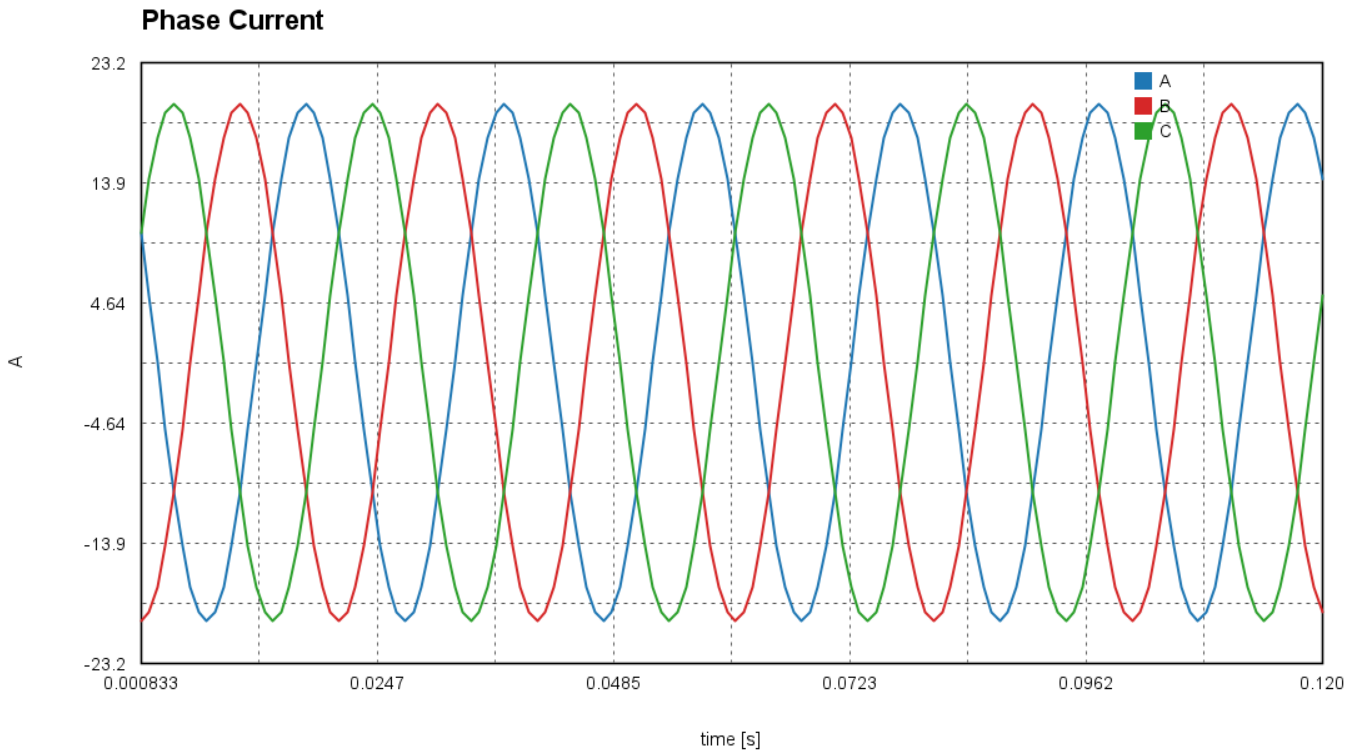
Equivalent Circuit Parameters (Time-Harmonic)

Parameter	Value	Unit	Comments
Stator Resistance (Rs)	738.877	mOhm	per-phase stator winding
Rotor Resistance (Rr)	309.756	mOhm	referred to stator
Magnetizing Inductance (Lm)	36474.2	uH	
Stator Leakage Inductance (Lls)	2178.34	uH	
Rotor Leakage Inductance (Llr)	2178.34	uH	referred

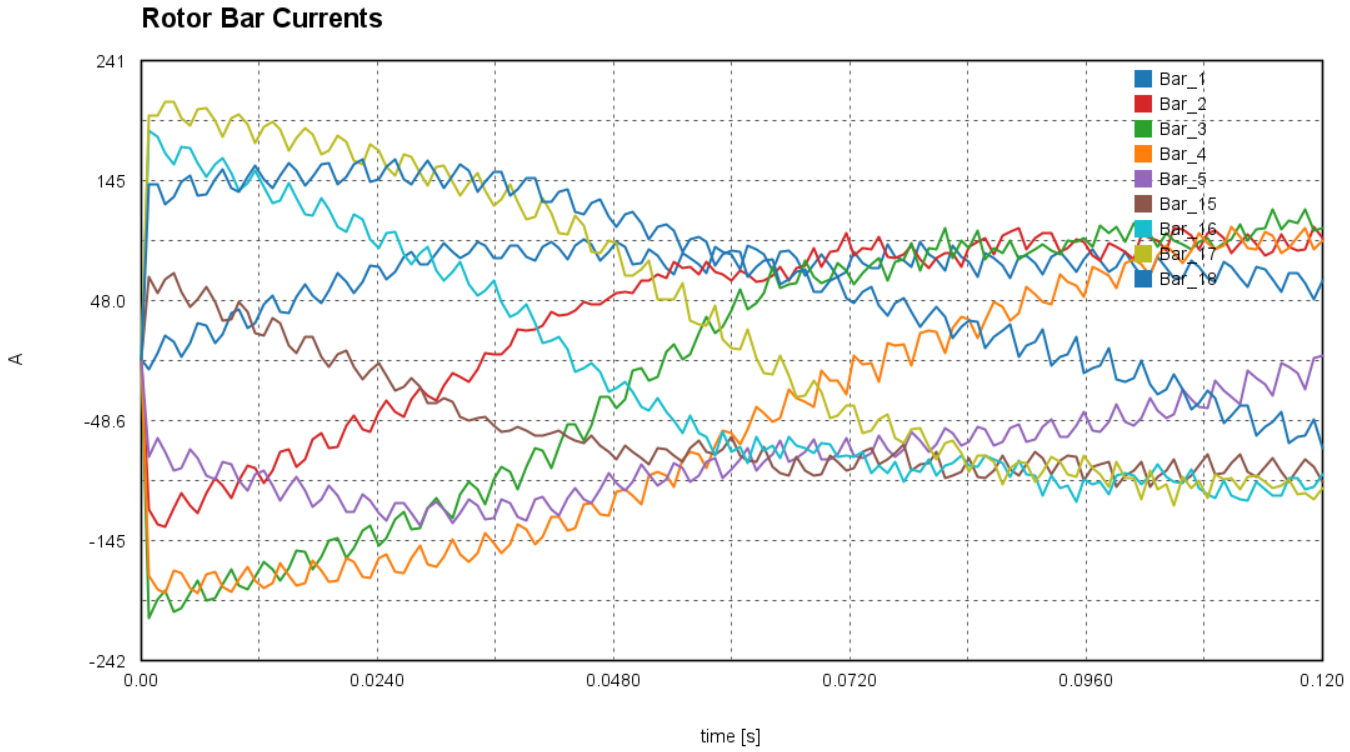
Key Waveforms



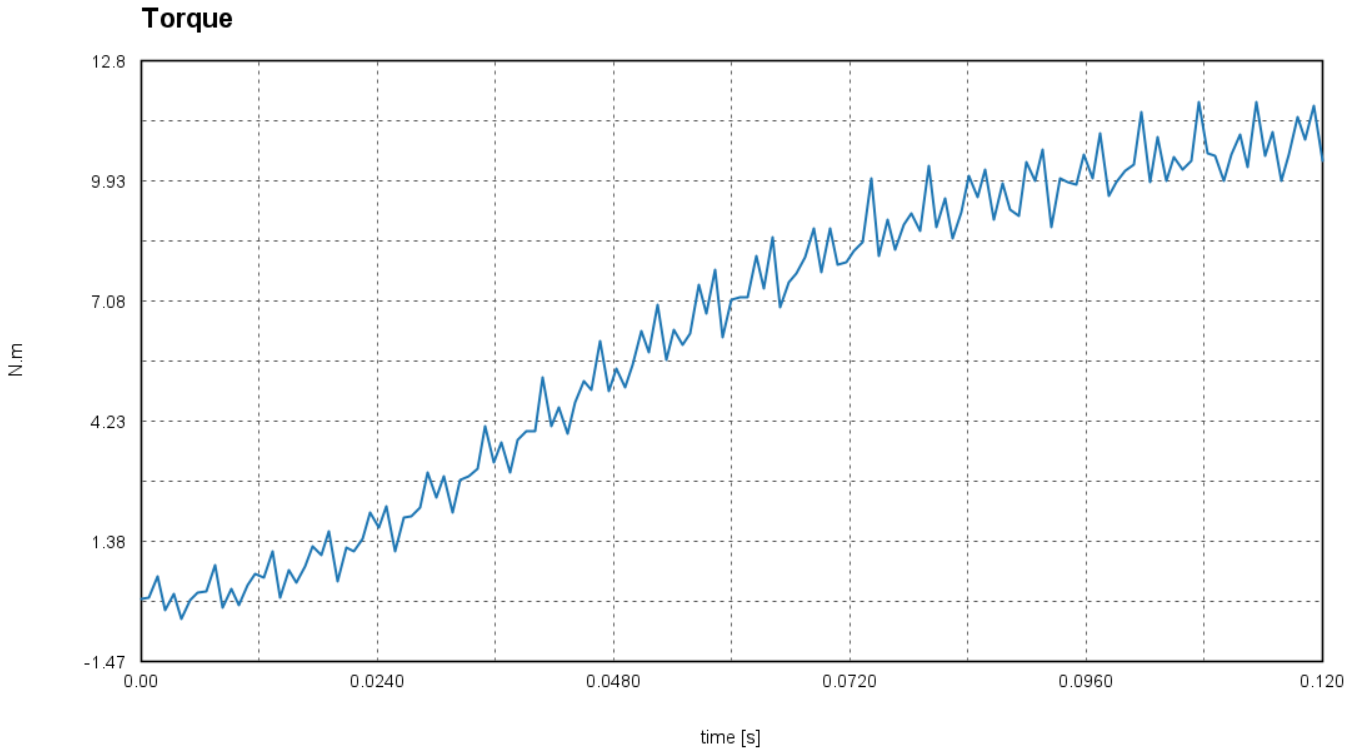
Full simulated range (144 samples). y-axis: V.



Full simulated range (144 samples). y-axis: A.



Full simulated range (145 samples). y-axis: A.

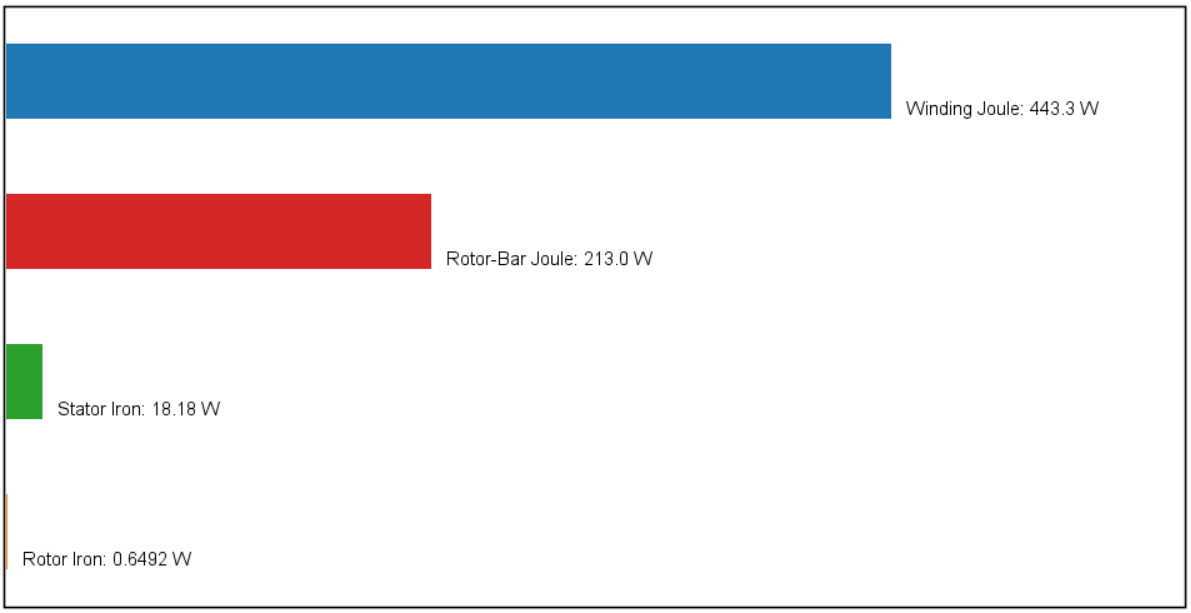


Full simulated range (145 samples). y-axis: N.m.

Loss Summary

Parameter	Value	Unit	Comments
Winding Joule	443.326	W	
Rotor-Bar Joule	212.962	W	
Stator Iron	18.1778	W	
Rotor Iron	0.649227	W	
Total Losses	675.115	W	
Efficiency	70.2378	%	
Power Factor	0.589485	-	

Loss Breakdown



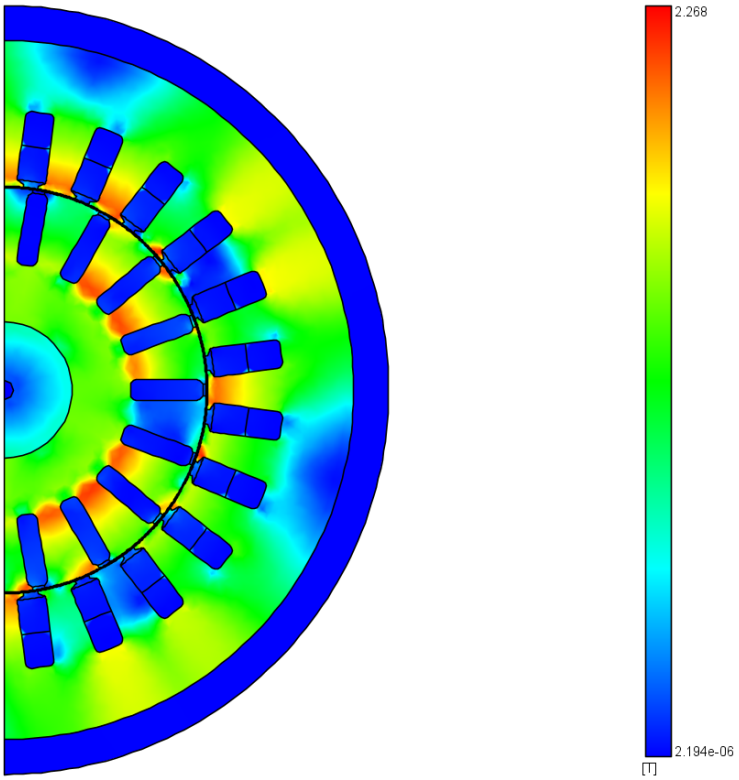
Total losses: 675.12 W

Performance Analysis

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

Field Images

Flux Density Magnitude |B|



step 145/145 | t = 0.120000 s | rotor position = 0.00 deg