



Fault Zone – Stator

The stator fault zone is often considered one of the most controversial fault zones due to the significant challenge of early fault detection and the prevention of motor failure surrounding the stator windings. Stator windings are the heart of the motor, producing the rotating magnetic field, induction current, and torque to turn the rotor and shaft. This challenge is further intensified in higher voltage machines, where the fault-to-failure time frame becomes much shorter. The stator fault zone is identified as the health and quality of the insulation between the turns, coils, and phases within the slots and end turns of the electric motor.

Turn-to-turn or phase-to-phase shorts can be catastrophic to the motor and not necessarily be detected by the standard megohmmeter. Excessive inductive imbalance, resistive imbalance, vibration, partial discharge, or poor insulation quality can lead to stator failure and should be monitored regularly to prevent a shortened life of the electric motor stator. Stator analysis using EMAX technology is performed by evaluating the phase relationship of voltage and current for each of the three phases of an AC induction motor.

VOLTAGE

Field RMS	Vol RMS	C.F.	THD	
Voltage 1-2	477.58	47.35	1.41	1.10
Voltage 2-3	472.57	47.29	1.40	1.11
Voltage 1-3	472.54	47.28	1.40	1.42
Average	472.43	47.34		
% Imbalance	0.11	0.19		
% NEMA Deviation	100.00			
Voltage 1	222.76	22.97	1.41	1.30

CURRENT

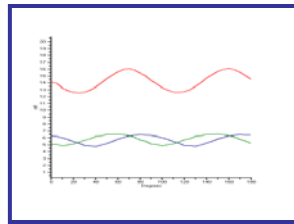
Field RMS	Vol RMS	C.F.	THD	
Current 1	107.20	107.20	1.00	1.20
Current 2	93.76	93.83	1.44	1.54
Current 3	80.76	80.81	1.41	1.54
Average	93.90	93.95		
% Imbalance	30.92	30.92		
% FLA	83.71	83.78		

IMPEDANCE

Phase	Real	Imaginate	Angle
Phase 1	1.6	1.0	31.0
Phase 2	3.76	10.66	70.0
Phase 3	2.11	6.19	69.9
% Imbalance	43.40		

High current imbalance with a high impedance imbalance points to stator fault.

What the RIC will look like.



% Resistive and Inductance Imbalance trending higher indicates a loss of turns.

MCEGold (Todd_1\MCEGold\MCEGold_Local) Testing [Test History] CNDRSR P

File Options Asset Manager Message Data Windows

Site Navigator Asset Summary Name Plate Add Asset Site Condition Test History Warn

File Edit View Test Warning Settings Show/Hide Options

MCE [All Tests]

Stator	AC Standard	Polarization Index	RIC	Step Voltage
Test Date	4/1/2002			
Test Time	11:52:46 AM			
Test Location	Motor Lead			
User	Administrator			
Frequency	1200			
Charge Time	60			
Voltage	500			
Motor Temp	15	23	15	
Measured Mohm	1900.00	> 2000	> 3006	
Corrected Mohm	336.00	> 2000	> 3006	
pF Ph 1 to Ground	26000.00	26250.00	26250.00	
ohm Ph 1 to 2	0.04550	0.14550	1.4050	
ohm Ph 1 to 3	0.04650	0.14450	1.4450	
ohm Ph 2 to 3	0.04600	0.14550	1.4550	
mH Ph 1 to 2	4.250	14.000	1.070	
mH Ph 1 to 3	5.145	8.265	2.85	
mH Ph 2 to 3	4.200	9.030	65	
Average Inductance	4.532	8.432	8.473	
% Res. Imbalance	1.09	1.86	2.09	
% Ind. Imbalance	13.53	66.04	66.05	

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File Options Asset Manager Message Data Windows

Site Navigator Asset Summary Name Plate Add Asset Site Condition Test History Warning Settings Test Selection Search Watch List MCE Auto Emax Fault Zones

Fault Zone Report - Back Wash Pump #1

Dir: Test - Options

Condition Code	Test Type	Date	Condition Code	
Power Circuit	Voltage Imbalance (%)	0.13	31/4/2000 5:10:41 PM	Good
	Phase Inductance (%)	0.21	31/4/2000 4:37:20 PM	Good
	Voltage THD Ph-Ph (%)	1.31	31/4/2000 5:10:41 PM	Good
Power Quality	Current THD (%)	1.54	31/4/2000 5:10:41 PM	Good
	IRMP (%)	0.01	31/4/2000 5:10:41 PM	Good
Insulation	RTG (Mega)	191.00	31/4/2000 4:37:20 PM	Good
	PI	2.13	31/4/2000 4:50:41 PM	Good
	CTG (uF)	70000.00	31/4/2000 4:37:20 PM	Good
Stator	Imp. Imbalance (%)	43.40	31/4/2000 5:10:41 PM	Severe
	Inductive Imbalance (%)	26.50	31/4/2000 4:37:20 PM	Severe
Rotor	Fa Amplitude (Delta dB)	83.29	31/4/2000 5:09:10 PM	Good
Air Gap	Eccentricity			Not Tested
	Peak One (Delta dB)	Not Tested		Not Tested
	Peak Two (Delta dB)	Not Tested		Not Tested
	Peak Three (Delta dB)	Not Tested		Not Tested
	Peak Four (Delta dB)	Not Tested		Not Tested
	RIC (Counts)	Not Tested		Not Tested

Last Updated: 8/16/2006 4:05:11 PM

The MCEMAX powered by MCEGold™ provides a Fault Zone Report, which is a one-page summary of the test results relevant to the six fault zones. The Fault Zone Report may be reached directly through the Fault Zones icon on the toolbar.