



INSTANTANEOUS POWER ANALYSIS

IDENTIFIABLE FAILURE MODE

- Operation of the motor outside its design parameters
- High resistance connections in the power circuit
- Excessive harmonic distortion to the power signal

DESCRIPTION

Instantaneous power analysis is performed using current clamps (up to 5000A) and voltage probes. The connections are made directly on the motor supply or in the case of HV installations through the CT's and VT's.

Full analysis of the voltage and current signal is performed with crest factor, THD and imbalance being calculated.

Self impedance values are calculated with the impedance imbalance being calculated.

Power and efficiency calculations are carried out with kW, kVar, kVA, power factor, efficiency, Output kW and output torque being recorded.

The test can be applied to stator and rotor windings on AC induction motors, AC synchronous motors and AC wound rotor motors.

ANALYSIS APPLICATION

Voltages above the rated nameplate voltage result in increased stress to the motors insulation system.

Voltages below the design voltage result in increased currents and overheating of the insulation system.

Voltage imbalance results in high negative sequence currents and overheating of the insulation system.

Voltage and current crest factor identifies voltage and current spikes that can result in the overheating of the insulation system.

Voltage and current THD results in increased current and non-efficient power signal.

Current imbalance results in overheating of the insulation system and increased vibration levels.

Self impedance imbalance can be caused by stator winding defects that result in insulation failure.

APPLICABLE STANDARD / ACCEPTANCE CRITERIA

AS 1359 and NEMA MG1-2003



Voltage					Power				
	Fund RMS	Tot RMS	C.F	THD		kW	kVar	kVA	Pf
Voltage 1-2	5479.03	6530.43	1.45	7.01	Phase 1	585.17	756.32	956.27	0.87
Voltage 2-3	5638.61	6601.05	1.46	3.10	Phase 2	591.67	737.91	945.82	0.88
Voltage 1-3	5524.18	6558.88	1.45	6.35	Phase 3	640.93	754.42	989.93	0.89
Average	5547.27	6563.45			Total	1817.77	2248.65	2892.01	0.88
% Imbalance	1.65	0.57	HVF	0.01	Power Sequence	1817.77	981.81	2065.98	0.88
%NEMA Derating	97.27	%NEMA	Derating	100.00					
Voltage 1					Efficiency				
	3148.34	3766.16	1.44	7.56	Efficiency	96.37			
Voltage 2	3218.83	3794.89	1.45	5.00	HP Output	2349.58			
Voltage 3	3240.96	3807.18	1.45	4.11	kW Output	1751.75			
Average	3202.71	3789.41			Torque Output	8300.82			
% Imbalance	1.70	0.61							
Current					Sequence				
						Positive	Negative	Zero	
Current 1	213.88	253.91	1.47	6.46	Volt Phase-Phase	5546.86	95.27	0.00	
Current 2	209.13	249.24	1.46	6.88	Volt Phase-Neutral	3202.48	55.00	2.37	
Current 3	222.09	260.02	1.46	3.02	Current	215.00	6.70	0.37	
Average	215.04	254.39							
% Imbalance	3.28	2.21				Self	Angle	Mutual	Angle
% FLA	78.48	92.84			Zero	14.90	28.41	14.90	268.41
					Positive	0.44	144.92	0.72	229.28
					Negative	0.07	308.73	0.06	320.53
Impedance					Phase Configuration				
	Real	Magnitude	Angle		Line to Neutral 120 Degree				
Phase 1	11.79	14.72	29.66		Phase Rotation				
Phase 2	13.53	15.39	28.49		Clockwise				
Phase 3	10.99	14.59	27.07						
% Imbalance	13.23								

