Service note

ABB Performance Evaluation Program
For on-site assessment of motor operation

Performance Evaluation Program is a new approach to diagnostic services for electric motors. It shows how the motor is actually operating in its specific environment, i.e. how external factors affect its operating characteristics.

When an electric motor has been installed and commissioned, there will be a number of factors that affect its actual performance.

These external factors will impact the following motor parameters:
- Torque
- Currents
- Efficiency
- Power factor
- Temperature

The combined effect of changes in these parameters will cause the motor to deviate from its original design.

Evaluating performance to determine this deviation provides useful information on how to operate the motor and whether any corrective action is needed.

Benefits of on-site performance evaluation include:
- More informed decision making to address known and unknown issues with the motor.
- Seamless integration with ABB's condition monitoring technology: one set of measurements can be used for both condition and performance reports, providing a 360 degree view of the motor.
- Specific recommendations on problem areas along with clear action points.
- Support in implementing the action points from ABB's expert service organization, along with OEM level knowledge.
- Measurements are taken in-situ and are non-intrusive with regard to motor operation.[1]

1 Method of performance evaluation may vary depending on the issue to be addressed

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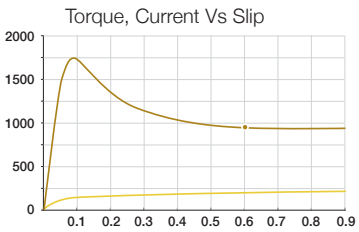
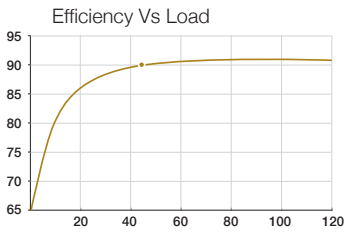
Deliverables
– performance data calculated from on-site measurements

Regenerated performance graphs

- Torque, current vs. slip
- Efficiency vs. load
- Power factor vs. load
- Temperature vs. load





Loss estimations at rated load

- Iron losses
- Friction and windage losses
- Stator I2R losses
- Rotor losses
- Stray losses

Loss estimations

	Recalculated nameplate
Iron losses	1.64
Friction and windage losses	2.01
Stator I^2R losses	1.41
Rotor losses	1.53
Stray losses	1.02
Total losses	8.60

Validated performance parameters

- Supply voltage and frequency
- Power factor
- Underloading due to current
- Underloading due to power factor
- Power overload
- Efficiency erosion
- Rotor losses
- Stator losses
- Oscillating loads
- Cooling effectiveness

Power factor validation

Rated PF(-)	0.83	OK
Recalculated rated PF(-)	0.828	

IF NOT OK:
Indicates that the magnetic wedges haven't been replaced with the materials of appropriate properties. If rotor has incorrectly been machined in the past, air gap may have abnormally increased, which would mean additional losses among other things. Also may indicate high saturation in the stator/rotor teeth of the motor in certain parts.

ACTIONS:
- Magnetic wedges may have to be used (if not already used)
- Rotor may have to be replaced
- PF compensating capacitors can be installed

Under-loading (current)

Operating load (%)	45.20	NOT OK

IF NOT OK:
Indicates that the motor is oversized

ACTIONS:
- Explore replacement opportunities or installation of VFDs

On-site performance measuring process

ABB MACHsense-P

For more information please contact:

www.abb.com/motors&generators

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