

# SKF On-line Motor Analysis System NetEP

Baker/SKF understands the difficulty faced when trying to both reduce costs and maximize electrical equipment reliability and productivity. The SKF On-Line Motor Analysis System-NetEP offers real time data on plant operations and efficiencies. This changes the rules of machine maintenance. Typically, maintenance professionals do one of two things: wait for equipment to break or shut them down for periodic testing. The NetEP offers a third alternative. Monitor rotating machinery from the convenience of your office or anywhere an Internet connection is available. Break away from time consuming route-base data gathering tools.

Based upon the monitoring capabilities of the existing proven EXP technology, the NetEP features permanently installed data collection mechanisms and combines them with server connections to put machine data at your fingertips without having to go into the field. It continuously gathers data on multiple voltage busses and motors.

#### Increase machine service life

The predictive nature of the NetEP allows the user to extend the working life of rotating equipment by providing them the information needed to locate faults at an early stage, thus preventing unnecessary downtime. Finding these faults early will also avoid the domino effect of components damaging each other or reducing performance life.

The NetEP automatically gathers information 365 days a year, offering data acquisition not possible with a portable route-based analyzer. This type of consistent data flow will provide the maintenance professional with better trending and a higher degree of confidence in decision making on rotating equipment.





#### On-line acquisition capabilities

The NetEP integrates a wide range of machine monitoring capabilities within a network framework. This permanently installed unit offers high capacity data collection from up to 7 different voltage busses with a maximum of 32 motors attached to a single NetEP unit. Connect multiple NetEP systems to one server and monitor thousands of motors from anywhere in the world. Two data acquisition methods are available: power quality every ten seconds and time waveforms once an hour.

## Continual rotating machine evaluation

The NetEP system operates with one voltage measurement per buss and current sensors installed for each motor. It analyzes 120+ electrical parameters and compares the results to user defined limits, alerting the user if these limits are exceeded. Fault alarms are received via a server network connection.

The design demonstrates our ongoing commitment to quality, reliability and competitive advantage. The NetEP provides data on degradation of motor performance and the effects of overheating on motor operation. It also surveys plant motor efficiency, determine load mismatches and oscillating loads. Results and problem notification are immediate, showing operating efficiencies, thereby allowing the user to determine the true cost of wasted energy.

### SKF Motor Condition Surveyor software interface

The SKF Motor Condition Surveyor software automatically compares the collected data to user defined parameters and indicates to the operator the condition of the machine via five status levels. The software will display the condition of each motor in the alarm view using a color-coded technique. This color coding is displayed throughout the software, including the motor tree, for easy identification of motor status.

Besides motor status, the tree view also displays the mapping of voltage busses and machine hierarchy within the plant. Utilize the Surveyor software's multi-motor view to monitor the status of motors from one screen. Markers, cursors, box zooming, slide scaling and other tools help the maintenance professional maneuver through large amounts of data quickly to confirm alarms and make informed decisions about machine processes.

Since machine monitoring is performed 24/7, 365 days a year, a watch, caution and warning flagging system has been developed to indicate to the maintenance professional that a machine condition needs attention. The software will also allow the operator to mark and automatically analyze the rotor condition, along with housing a bearing database of 30,000 bearings to help with the identification of bearing faults.

## Trending with the SKF Motor Condition Surveyor

The software delivers data on 120+ different parameters and produces alarms on 38 parameters. Some parameters gather trendable data every ten seconds while others gather data once per hour. This 24/7 approach to data handling offers complete system monitoring including third shift operation habits. The software displays the time, data and start and stop times of every machine monitored and puts the data at the user's fingertips.



🔹 Surveyor - [Alarms]									X
🌋 (	jie j	<u>V</u> iew <u>T</u> o	ools <u>W</u> inc	low <u>H</u> el	р			- e	۶×
i 📂 (	9   1	b B.	🗢 け 📖	S   🕐 I	Print Screen				
Toggle View									
	<b>N</b>	<b>\$</b>	Cây-	<b>a</b>	<b>Car</b>	<b>E</b>	÷	ŵ	
m	01	v1	ac10	ac9	ac8	ac6	ac7	8 Amp	
6	<b>)</b>	<mark>®</mark>	Ð	<b>e</b>	ø	Ð	<b>@</b>	<b>@</b>	
2 A	mp	RTU1 Fan	hi voltage machine	RTU6 fan	RTU3 Comp Scott	RTU6 Comp	RTU8 Fan	RTU4 Comp	
	The second se	¢.	City	۲. ۲	<b>B</b>	(i)	<u>ن</u>	-	
Labi	motor	RTU3 Fan	4 Amp	6 Amp	acm wo vbus	10 Amp	RTU4 Fan	VDivider	
	T-	<b>B</b>			¢.	<b>B</b>	ŵ	<b>B</b>	
RTU8	Comp	vdivider5	ac3	ac4	ac1	ac5	ac2	build 49 test machine	
hi voltage machine:									
Ready AlphaMotors (50% Full) matt Admin							in 🔐		

## Advanced data collection and organization

As round robin testing is completed, results are saved and stored for each motor. This type of documentation is critical for any maintenance program. It allows the recalling of information for trending. Test results are managed using Microsoft© SQL Server capabilities.

### Sequencing acquisition (Basic motor moni-toring)

• Default mode for each motor. Automatically sequences to each motor acquiring power quality, distortion peak levels, unbalances, crest factor and symmetrical components data.

#### Time waveform acquisition

- Gathers spectral data for current, torque and voltage, in addition to motor speed, rotor bar, eccentricity, power out, % load, % efficiency, effective service factor, input power, power factor, torque time waveform and KVAr data.
- Fmax to 6000 Hz

#### NetEP software overview

- NetEP device: Measurement engine.
- NetEP Server: Data storage and communication. Can be anywhere on the network. Also available as a service from Baker/SKF.
- SKF Motor Condition Surveyor: User software interface.

### Testing benefits

Power quality

#### Identifies:

- Improper tap settings on supply transformers
- Poorly distributed single phase loads
- Overloading (saturating) supply transformers
- Missing or open power factor correction capacitors.
- Voltage surge/sag

#### Machine performance

#### Identifies:

- Thermal overloading of the motor and machine deterioration from heat-related issues.
- Motor efficiency
- Motor speed
- Percent load

#### Current

- Identifies:
  - Overloading
  - High resistance connections
- Miss connectionsIron saturation and
- Improperly wound motors

### Current/Voltage Spectrum Identifies:

- Saturation problems
- Broken rotor bars
- Eccentricity



#### Torque

Identifies:

- Mechanical issues
- Transient overloading
- Mechanical imbalances
- Bearing problems
- Cavitation
- Worn impellers

#### Technical specifications/Technical capabilities

- Continuously monitor 120+ parameters on up to 32 motors on 7 voltage busses
- Measurements include: Peak, RMS, THD, TD, CF, unbalance, power factor, input power and symmetrical components for each V, I phase, and in total.
- and in total. • Spectrum acquisition (3 phases, voltage and current)
- Time waveform acquisition
- Torque time waveform, torque spectrum
- Speed
- Eccentricity
- Power out
- % Load
- % efficiency
- Effective Service Factor

#### Identify preventative maintenance opportunities

- Set alarm limits for parameters
- Display trends for parameters

#### Surveyor capabilities

- At a glance status for all machines, view multiple NetEP's
- Dashboard showing over 40 measurements
- Time waveforms
- Spectrums with markers
- Trending
- Add, delete, modify machines, alarms, voltage busses
- Torque time waveform and spectrum
- Acknowledge alarms
- Data retention

Specifications					
LAN AC Input Power	Ethernet 802.4 100/1000 Base T 110 V – 240 V required				
Current Transformers (CT)	5 A – 2000 A, up to 150 ft CT signal runs on Cat V cable, 25 K Hz signal acquisition				
Voltage Busses	Up to 7 different voltage busses, up to 1000 V direct input or PT's, line-to-line, line-to-neutral, external disconnect required.				
Computers: data storage and network based monitoring	Provided by customer				
Server requirements	<ul> <li>Greater than 2 GHz Pentium, Core2 Duo or equivalent</li> <li>Greater than2 GB RAM</li> <li>Greater than 10 GB free disc space per NetEP connected</li> <li>Windows XP, Vista, 7 or Server 2003</li> <li>10/100 LAN connection</li> <li>Microsoft SQL or SQL Express</li> <li>Static IP Address</li> <li>UPS recommended</li> </ul>				



#### The Power of Knowledge Engineering

Drawing on five areas of competence and application-specific expertise amassed over 100 years, SKF brings innovative solutions to OEMs and production facilities in every major industry worldwide. These five competence areas include bearings and units, seals, lubrication systems, mechatronics (combining mechanics and electronics into intelligent systems), and a wide range of services, from 3-D computer modelling to advanced condition monitoring and reliability and asset management systems. A global presence provides SKF customers uniform quality standards and universal product availability.

Baker Instrument Company, an SKF Group Company 4812 McMurry Avenue, Fort Collins, CO 80525 T: 970/282-1200 - 800/752-8272 F: 970/282-1010 www.bakerinst.com

® SKF is a registered trademark of the SKF Group.

® Baker is a trademark of the SKF Group.

Microsoft and Windows are either registered trademarks or trademarks of Microsoft Corporation in the United States and/or other countries.

© SKF Group 2010

The contents of this publication are the copyright of the publisher and may not be reproduced (even extracts) unless permission is granted. Every care has been taken to ensure the accuracy of the information contained in this publication but no liability can be accepted for any loss or damage whether direct, indirect or consequential arising out of the use of the information contained herein.

PUB SR/S7 10787 EN  $\cdot$  September 2010

Printed in USA on environmentally friendly paper.



