



# Explore the possibilities

with SKF integrated sensor solutions for off-highway vehicles



The Power of Knowledge Engineering

# Integrating new sensor opportunities

You know the challenges: increasingly stringent emissions regulations, higher demands on ergonomics in mobile equipment and the need to enhance vehicle productivity. Simply put, the need for high-resolution sensor capabilities and condition monitoring competence is growing.

And SKF is helping to lead the way.



*Measurement of angular position*



*Cabin rotation control and angular position of joints*

## Working together

Whether you are an OEM in construction, agriculture, forestry or forklift truck industries, let us explore together the opportunities to integrate sensor solutions in to your vehicle designs. Perhaps you want to introduce new functionality or optimize equipment performance. At SKF, we know how and where sensor integration can make the difference.

## Typical applications

- Engine management
- Steering
- Cabin rotation control
- Angular position of joints
- And much more

# ... for you and your customers

SKF sensor solutions are about much more than integrating advanced sensing technology in bearings and other products.

It's about integrating functions and processes into your vehicles that open up new opportunities for you and your customers.



*Temperature and vibration (acceleration)*



*Speed sensing*

## Integration makes sense

By integrating SKF sensor technology, your customers get robust and well-proven solutions where the most reliable and precise measurements can be taken – at the bearing or shaft. Since an SKF solution is truly integrated, there are fewer parts, making it compact, reliable and cost effective.

## Keeping your vehicles at the forefront

You can rely on a strong, stable partner for your sensor needs. SKF's wide range of integrated sensor products and flexibility provide customized solutions that can meet the specific needs and requirements of your application. Our goal is to help equip your vehicles with leading edge technology so that your company can be even more profitable.

## We can help you to:

- Introduce more functionality for improved end-user experience
- Improve machine productivity and reliability
- Improve motor management to meet emissions regulations
- Build more compact equipment
- Integrate end-user safety features
- Offer vehicles that stand out



# Sensor technology

## Enabling robust, compact integrated solutions

Innovative, reliable and well proven, SKF sensor technology is state of the art and based on our extensive knowledge and experience of bearings and surrounding machine parts. We know how to apply this technology to help you meet the ever increasing demands in the off-highway vehicle industry.

## Proven performance in tough conditions

Thoroughly tested and proven to perform in rough off-highway conditions, our integrated sensor solutions are hard at work around the world in applications such as cabin rotation, sensor bearings on motors and speed sensors on trams.

In addition to the off-highway industry, SKF is a trusted supplier of integrated sensor solutions to customers in industries such as automotive, railway, conveyor and electric motors.



*The sensor unit includes a code ring, which is linked with the rotating inner ring of the bearing. The sensor provides rotational speed and incremental or absolute position output.*



*Since the sensor is integrated into the bearing, protecting both the electronics and mechanics, it is a very robust solution for harsh working environments.*

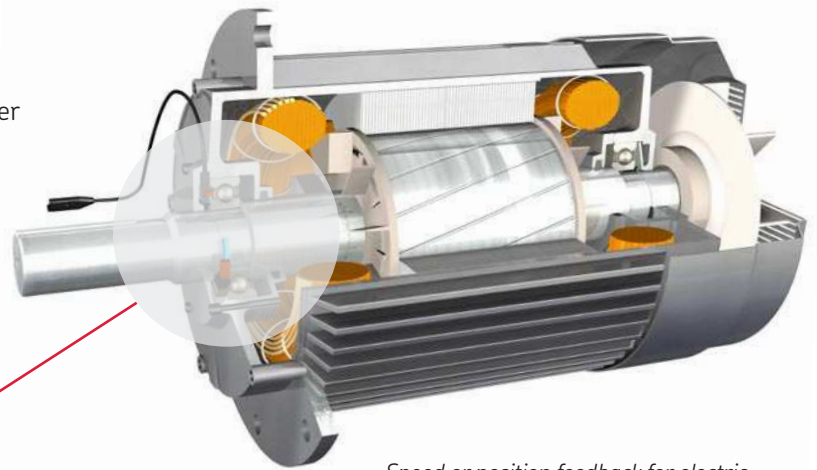


# At the heart of it all

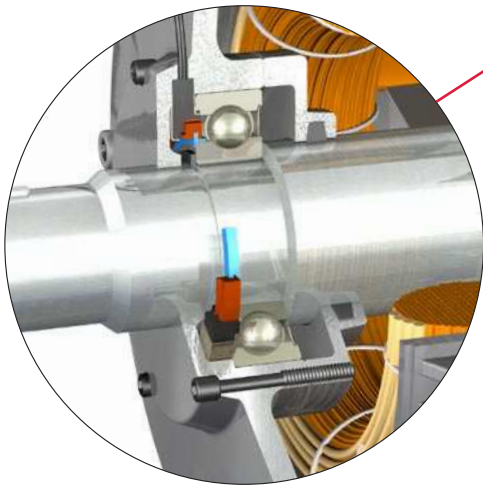
With SKF, your customers can look forward to new functions and processes that are only possible by being able to get accurate feedback on critical variables such as position, speed, linear movement, temperature and vibration.

## Reliability is built in

Because SKF sensor solutions are truly integrated, fewer components are required. This contributes to reduced size and weight, while also helping to reduce costs. What is more, the integrated design helps protect the sensors in demanding work environments.



*Speed or position feedback for electric motors in off-highway vehicles*



*Absolute angular position of off-highway cabins*





# Meeting modern sensor needs

We've got you covered. To help you and your design team meet new demands and realize new opportunities, SKF offers a wide range of complete integrated sensor products and solutions.



End of shaft multi-turn sensors



Absolute through shaft sensors



Sensor bearing units



Roller encoder units



High resolution incremental speed sensors



High resolution absolute position sensors



SKF Copperhead sensors (Acceleration, temperature)



Magnetic tone rings

## Features and performances

Product	Measurement					Resolution	Signal output			Integration in application
	Position	Speed	Linear	Temperature	Vibration		Absolute/ incremental	Analogue	Digital A & B	
End of shaft multi-turn sensors	•					Dependent on number of turns	abs	•		End of shaft
Absolute through shaft sensors	•					683 ppr	abs	•		Through shaft
Sensor bearing units		•				32 to 80 ppr	incr		•	Through shaft
Roller encoder units			•			32 ppr	incr		•	Parallel to shaft or along the shaft
High resolution incremental speed sensors		•				122 to 7808 ppr	incr		•	Through shaft
High resolution absolute position sensors	•					5632 ppr	abs		•	Through shaft
SKF Copperhead sensors				•	•	n.a.	n.a.	•		Attached



# Your partner in sensor integration

With SKF, you can rely on a committed, global partner with the knowledge and resources to best support the needs of your operation. Our approach is clear: to work together with you and your design team to develop unique solutions that can help reduce your manufacturing costs, while helping to increase the productivity of your customers.

### Bringing it all together

When it comes to integrating sensors into bearings, resulting in the optimal position for accurate measurements, SKF offers unmatched capabilities. We are able to apply our various competences – from bearings and seals to lubrication systems and mechatronics – to design a tailored, best-in-class sensor integration solution that meets your specific requirements.

### Extensive industry experience and application knowledge in:

- Construction
- Agriculture
- Forestry
- Forklift trucks

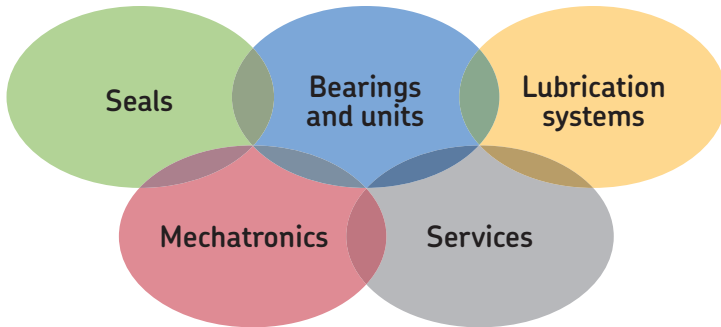
### Why SKF integrated sensor solutions?

- You can get customized solutions designed to meet your specific needs – we have the capabilities
- More robust and compact due to built in sensors
- Ability to measure at the optimal position – the bearing or shaft – for greater precision

### Let's get started today

With SKF sensor integration, you have a lot to look forward to. Contact your local SKF representative today for more information or visit [www.skf.com](http://www.skf.com)





### The Power of Knowledge Engineering

Drawing on five areas of competence and application-specific expertise amassed over more than 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 services. A global presence provides SKF customers uniform quality standards and worldwide product availability.

® SKF is a registered trademark of the SKF Group.

© SKF Group 2011

The contents of this publication are the copyright of the publisher and may not be reproduced (even extracts) unless prior written 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 45/S2 11206 EN · March 2011

Printed in Sweden on environmentally friendly paper.

Certain image(s) used under license from Shutterstock.com