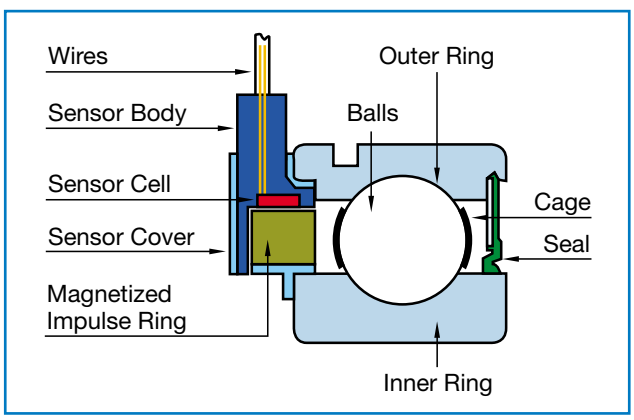
Sensor Bearing Units

The Future in Industrial Vehicle Control

SKF sensor bearing units, which integrate bearing function with sensor electronics, are capable of detecting shaft speed and acceleration, direction of rotation, and angular position. These units have a robust and simple design, offering high signal accuracy and reliability, compactness, and ease of assembly.

Sensor bearing units are key components in the progression of industrial vehicle technology, enabling manufacturers to improve upon the performance of current mechanical systems while reducing costs. Sensor bearings mark an important step in the evolution of AC motor control in electric industrial vehicles. Sensor bearings used in the electronic steering systems of industrial vehicles can replace heavy, expensive mechanical and hydraulic steering systems. Other applications for this bearing include height and position control systems. Using these systems, the operator can monitor the exact height of the load or preset load height with the touch of a button.

Operating Principle



A sensor bearing is composed of:

- High quality deep groove ball bearing
- A magnetic impulse ring (code ring)
- 2 sensors with a body and connecting cable

The sensor bearing operates according to the following principle:

The code ring, linked with the rotating inner ring, is magnetized with a sequence of north and south magnetic poles.

The number of digital pulses equal to the number of pole pairs on the impulse ring is generated on each revolution.

The output signal is transmitted to the customer's electronic processing unit by a connecting cable and connectors integrated into the bearing's sensor.

Applications

- **Steering Systems**
- **Mast Height and Related Systems**
- **Position Control Systems**
- **Motor Control (AC and Brushless)**

Sensor Features

The standard SKF sensor bearing utilizes two Hall Effect sensors. Each sensor set is a current-sinking open collector and provides two output signals (A and B) in quadrature. These signals are 90 degrees (electrically) out of phase to enable detection of rotational direction.

Output signal

Figure 1 shows the general specifications of the signal. Each of these signals has a 50% +/- 10% duty cycle.

The presence of two signals in quadrature enables an electronic processor to multiply the number of pulses of angular position increments per turn.

For instance, using a standard SKF sensor bearing with 64 pulses per revolution, and using a standard electronic interface detecting the rising (Low/High) and the falling (High/Low) times of each of the two signals. It is possible to obtain 256 countings per revolution, or 1.4 degrees angular resolution.

The number of magnetic poles, and therefore the number of final pulses (1 pulse = 1 period sequence) are dependent on bearing size. See table for the corresponding number of pulses/size.

Dimensions & Assembly

Standard SKF sensor bearings are based on ISO dimensions. Existing shafts and housings can therefore be used without modification. However, an additional 6mm of axial clearance must be left free around the pitch diameter of the bearing.

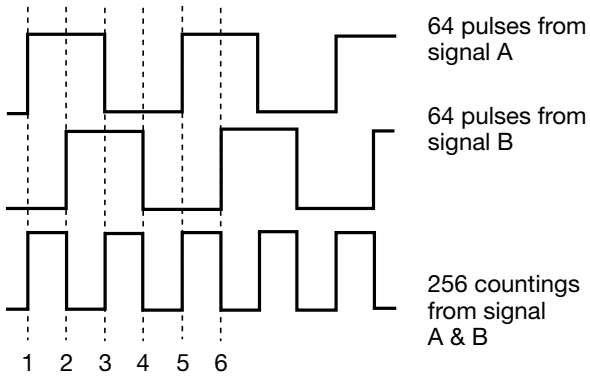
Temperature Range: -40˚ to 120 ˚C, peak 150 ˚C

Supply Voltage: 3.8 to 24 Volts

Output Current: of each signal wire (when transmitter is “ON”) limited to 20mA by the load resistors

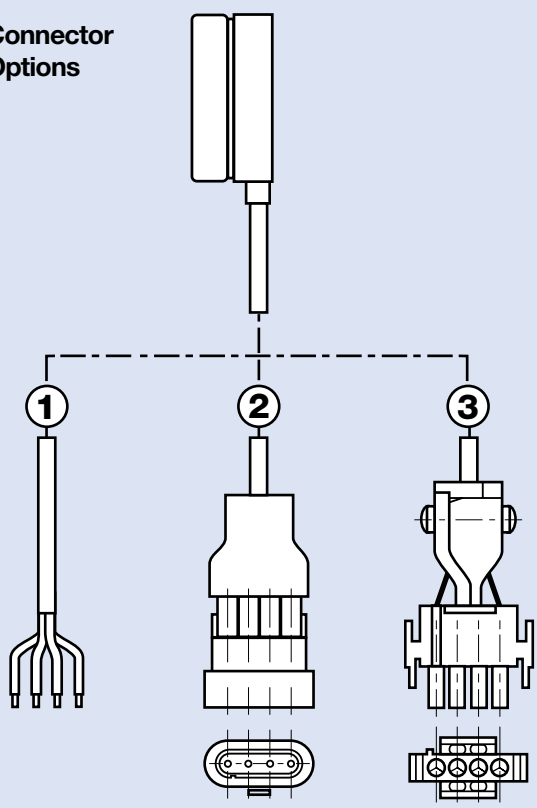
Conforms to EMC European norm EN-50082-2 1995

Figure 1



Unit Size	Number of Pulses	Recommended Max. Speed (RPM)
6202	32	13,000
6204	48	10,000
6205	48	8,500
6206	64	7,500
6208	80	5,600
6209	80	5,000

Connector Options



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