

# ENGINE CRANKSHAFT SPEED MEASUREMENT ERROR COMPENSATION

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**ABSTRACT:** Engine speed signal contains valuable and rich content information about the engine working process. Measurement of the engine speed is usually carried out by sensor wheels mounted on the crankshaft. Measurement errors are mostly influenced by geometric tolerances of the engine speed sensor wheel as well as by its radial run-out. In order to avoid the occurrence of this systemic deviation, in the lab and highest accuracy engine speed measurements are usually conducted by means of incremental encoders, radially and axially fixed to the crankshaft with the anti-twist safeguard toward the crankcase. This paper shows how this type of engine speed measurement, which is considered to be the most accurate, is prone to systematic errors as well. The influence of the kinematic parameters of the encoder - crankcase linkage, on the error occurrence is discussed as well as suggested methods for systematic deviation parameters identification and engine crankshaft angular speed error compensation.

**KEY WORDS:** engine speed measurement, measurement error, crank angle optical encoder, IC engine

## KOMPEZACIJA GREŠKE MERENJA BROJA OBRTAJA KOLENASTOG VRATILA MOTORA

**REZIME:** Signal broja obrtaja motora sadrži značajne i brojne podatke o procesu rada motora. Merenje broja obrtaja motora se obično izvodi sensorima postavljenim na kolenasto vratilo. Greške merenja su uglavnom pod uticajem geometrijskih tolerancija senzora broja obrtaja motora kao i njihove centričnosti. Da bi se izbegla pojava ovog sistemskog odstupanja, u laboratoriji se merenja visoke tačnosti broja obrtaja motora obično izvode primenom inkrementalnih enkodera, radijalno i aksijalno fiksiranih na kolenastom vratilu kako bi se izbeglo uvijanje u odnosu na kolenasto vratilo. Ovaj rad pokazuje kako ovaj tip merenja broja obrtaja motora, koji se smatra najtačnijim, dobro eliminiše sistemske greške. Uticaj kinematskih parametara enkodera na pojavu greške je tema rasprave kao i predložene metode za identifikovanje sistematskih odstupanja parametara i kompezacija greške ugaone brzine radilice.

**KLJUČNE REČI:** merenje broja obrtaja motora, greška merenja, ugao kolenastog vratila, optički enkoderi, IC motor

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