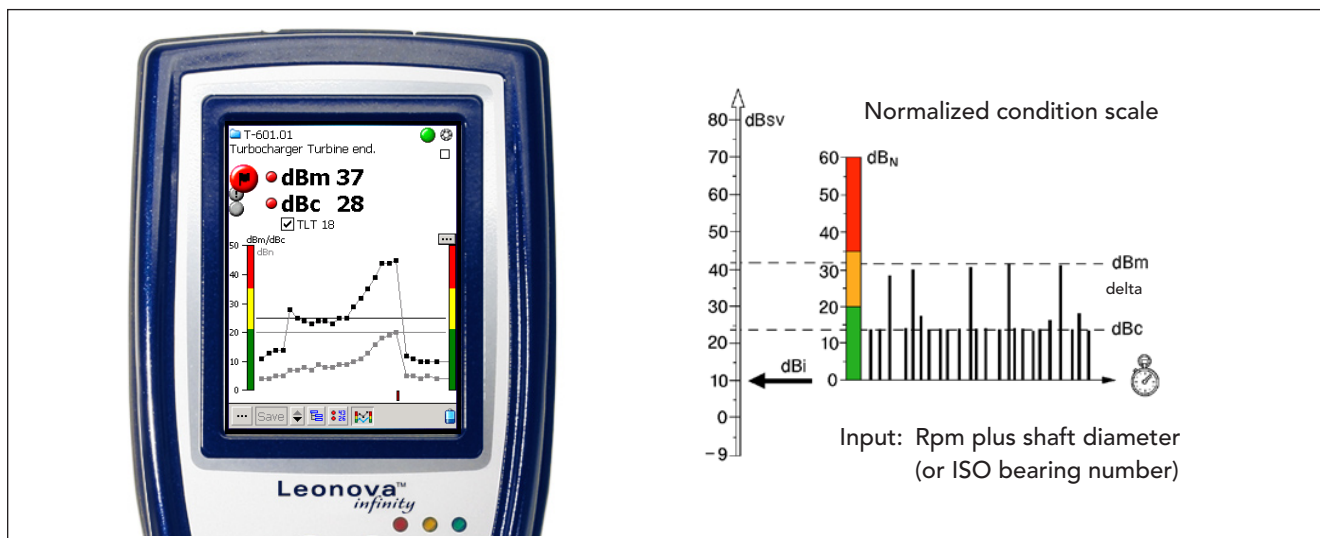


Leonova™ Infinity – Shock pulse measurement, dBm/dBc



For over 30 years, the original Shock Pulse Method (SPM) has been very successfully used to obtain a fast, easy and reliable diagnosis of the operating condition of rolling element bearings.

The signal

Throughout their lifetime, bearings generate shocks in the interface between the loaded rolling element and the raceway. These shocks 'ring' the SPM transducer which outputs electric pulses proportional to the shock magnitude.

Unlike vibration transducers, the shock pulse transducer responds at its carefully tuned resonance frequency of about 32 kHz, which allows a calibrated measurement of the shock pulse amplitudes.

Measurement

The shock pulse meter counts the rate of occurrence (incoming shock pulses per second) and varies the measuring threshold until two amplitude levels are determined:

- the shock carpet level (approx. 200 incoming shocks per second. This level is displayed as dBc (decibel carpet value).
- the maximum level (highest incoming shock under 2 seconds). This level is displayed as dBm (decibel maximum value). Using a blinking indicator or earphones, the operator can establish a peak value by increasing the measuring threshold until no signal is registered.

Because of the very large dynamic range, shock pulses are measured on a decibel scale (1000 x increase between 0 and 60 dB).

Shock pulse amplitude is due to three basic factors:

- Rolling velocity (bearing size and rpm)
- Oil film thickness (separation between the metal surfaces in the rolling interface). The oil film depends on lubricant supply and also on alignment and pre-load.
- The mechanical state of the bearing surfaces (roughness, stress, damage, loose metal particle).

Input data

The effect of rolling velocity on the signal is neutralized by giving rpm and shaft diameter as input data, with 'reasonable accuracy'. This sets an initial value (dBi), the start of the 'normalized' condition scale.

Evaluation

The initial value and the range of the three condition zones (green - yellow - red) was empirically established by testing bearings under variable operating conditions. The maximum value places the bearing into the condition zone. The height of the carpet value and delta (dBm minus dBc) indicated lubrication quality or problems with bearing installation and alignment.

Technical data

Measuring range:	-9 to 99 dBsv
Resolution:	1 dBsv
Accuracy:	± 1 dBsv
Transducer types:	SPM 40000/42000, probe transducer and quick connector transducer for adapters
Input data:	Rpm, shaft diameter (or ISO bearing number)
Output:	Maximum value dBm, evaluated green - yellow -red, carpet value dBc, peak value, audible shock pulse signal (earphones).

Ordering numbers

LEO130	Shock pulse method dBm/dBc, unlimited use
LEO230	Shock pulse method dBm/dBc, limited use

