Semi-automatic noise and vibration tester

MVU 600HA, MVU 600HR

General description

A noisy application might be caused by wavy bearing components, local defects in the rings and rolling elements, or by dirt particles in the bearing. While basic requirements on a bearing like stiffness, load capacity, speed limit and service life play a critical role in applications, low noise and vibration are becoming even more important.

Noise and vibration issues can be tested with bearing vibration equipment by SKF. We developed various range of noise testing devices for different bearing types and sizes. The latest development is a semi-automatic device for bearings up to 600 mm outer diameter.

The machine works semi-automatically and is equipped with a vertical high-precision hydrostatic oil spindle. The spindle is driven via a flat belt by an electric drive motor that is mechanically isolated from the machine frame. This guarantees an optimum isolation from environmental vibrations.

A SIEMENS PLC controls all mechanical movements of the machine from axial/radial loading, sensor adjustment and so on.
The test setup for a new bearing type (run-in time, measuring time, spindle speed, quality limits, spectrum mask, and so on) is freely programmable in the CMME 7001 measuring electronics. Once the setup is completed, all data can be saved to a configuration file under an arbitrary name and can be retrieved when the bearing is produced the next time.

The CMME 7001 acquires the measured bearing vibration signals, and determines the bearing quality according to user-defined quality classes. Usually, the three standard frequency bands are evaluated with user-defined limits. Special evaluation criteria according to customer requirements (e.g. specific frequency spectrum mask) are also possible. All important measurement results are documented and statistically compressed on various screens. The electronics is also prepared for network to other computer systems so that the results can be shared with other departments, e.g. to provide noise test data to the company’s quality assurance systems.

**Machine description**

1. Axial loading device
2. Axial loading tool
3. Safety cover
4. Safety light barrier
5. Hydraulic aggregate for testing spindle lubrication
6. Signal lamp
7. Monitor
8. Electrical cabinet
9. Control unit
10. Pneumatics

*Type specific arbor, axial and radial load possible.*
Functional principle

• Bearings need to be moved to and removed from the measuring station manually. The bearing slides on the transport plate are covered with teflon for easy handling.
• After the bearing is placed on the arbor, the spindle accelerates to the assigned measurement speed and an axial load is applied to the bearing’s outer ring by the loading tool – MVU 600HA. Using the MVU 600HR model, it is also possible to apply a radial load to the bearing.
• The SKF Laser Vibrometer MSL-7100 converts the radial vibration of the bearing into a velocity-proportional signal.
• The CMME 7001 electronics triggers the measurement, acquires the measured signal and evaluates the bearing vibrations according to user-defined limits and specifications.
• The SKF measuring electronics with the SKF evaluation software gives much more information in the narrow-band spectrum than the broad-band parameters L, M and H. These results can be shown in μm/s or Anderson units. The result identifies one or more possible defect types such as contaminated components, cage noise, or bearing component form deviations.

• Although relatively small damages can perhaps not be observed in any of the three vibration bands, they can be detected using the SKF peak analysis.
• The vibration measurement tolerances of various bearing types are stored in the computer and all measurement data are compared with these tolerances. If the measurement data are outside the tolerances, then the bearing continues its testing sequence within the machine. However, if the measurement data are outside the tolerances, then the screen shows a reject message.
Technical specifications

- **Mechanics**
  - Working range outer diameter: 140 to 600 mm (5.51 to 23.62 in)
  - Working range width: 10 to 250 mm (0.39 to 9.84 in)
  - Resetting time: Approx. 9 min
  - Axial test load: 600 to 3 000 N
  - Radial test load (MVU 600HR only): 200 to 5 000 N
  - Spindle speed: Standard 100 r/min, 250 r/min (recommended) or 350 r/min
  - Driving motor: 3 phases, 1.5 kW
  - Spindle type: Hydrostatic oil spindle
  - Paint: SKF Product White RAL 9002, SKF Product Blue RAL 5015, SKF Product Grey RAL 7024; other colours available as options

- **Electronics**
  - Measuring electronics: CMME 7001; for details see data sheet CMME 7001
  - Software: FPM, operating system Windows 10; for details see data sheet FPM
  - Vibration sensor: SKF Laser Vibrometer MSL-7100; Frequency range 0 to 10 000 Hz, optionally up to 25 000 Hz
  - Loudspeaker (option): MEB 122E
  - Control equipment: SIEMENS PLC
  - Environmental protection: IP 53

- **Dimensions and weights depends of machine version e.g.**
  - Dimensions (H × W × D): 2 135 × 2 390 × 2 167 mm (84.1 × 94.1 × 853.1 in)
  - Weight: Approx. 2 740 kg (6 040 lbs)

- **Requirements**
  - Electrical system: See rating plate
    - 3 × 400 V/50 Hz/25 A
  - Pneumatic system:
    - Air pressure: 5 to 5.5 bar (72.5 to 79.8 psi) at least, clean and dry air

- **Calibration tools 1)**
  - Digital load cell: To calibrate the axial bearing load
  - Alignment tools: To calibrate the alignment of the vertical loading cylinder
  - Spring balance 0 to 100 N: To calibrate the belt tension
  - Tachometer: To calibrate the spindle speed
  - Calibration exciter MSL-C 7000 for SKF Laser Vibrometer MSL-7100

1) One set per factory recommended

Technical specifications subject to change without notice.

For more information on your specific application please contact:

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