

Fan and Blower

Bearing Defect Detection and Vibration Monitoring Using the Machine Condition Transmitter (MCT)

By Torsten Bark • SKF USA Inc.

Fans and blowers incorporating rolling element bearings are ideal candidates for monitoring with SKF's Machine Condition Transmitters (MCT's). Using a single CMSS 2110 accelerometer with integral over-braided cable, the customer can realize the cost effectiveness of multi-parameter monitoring with a complementary pair of CMSS 590-ENV (enveloped acceleration) and CMSS 530-VEL (velocity) MCT modules. Multi-parameter monitoring encompasses monitoring a single bearing for two parameters. These parameters are enveloped acceleration for bearing defects and velocity for rotational deficiencies.

What mechanical deficiencies and bearing defects do we detect from monitoring fans with the MCT's?

All the following contribute to the cause of vibration or the generation of signals for which the early detection in the MCT's is designated for:

- Defective rolling element bearings (enveloped acceleration)
- Misalignment of drive couplings or installed bearings (1x r/min, axial, velocity)
- Unbalance from blade wear (1x r/min, radial, velocity)
- Unbalance from build-up of dirt and other deposits (1x r/min, radial, velocity)
- Machine looseness and foundation problems (2x r/min, radial (vertical), velocity)
- Defective drive belts (1, 2, 3 and 4x r/min of belts, radial, velocity)

Installing the MCT's locally and providing an analog output for use with centralized control systems (DCS, PLC etc.) for indication, decision making and protection (shutdown) are typical uses. In addition, the MCT's also provide two buffered signal outputs. One can be used for permanent connections, for example, routing it to the transducer input of a MCT enveloped acceleration module; the other can be used for temporary connections, for example, via front panel BNC connector to a portable instrument such as the SKF Microlog as part of a predictive maintenance plan.



Fig. 1. MCT transmitter with companion monitor (alarm unit).



Fig. 2. Recommended accelerometer CMSS 2110.

The locally mounted MCT can provide an early warning when incipient mechanical deficiencies begin to appear in either the driver, the fan or the blower. The MCT with companion monitor has two alarm relays that can also be wired to shut the fan down if matters become dangerous. The objective of installing MCT's is to prevent unscheduled failures to protect both the personnel and the machine.

Typical installation

Referring to **fig. 4**, the recommended accelerometers should be mounted at points A, B, C and D if the drive motor and the fan and/or blower are to be monitored. The accelerometers should be mounted in a horizontal direction, and if the bearing housing is split, the accelerometer should be mounted below the split.

The accelerometer is then connected to the transducer input of the MCT velocity module. The verified distance between sensor and MCT transmitter is at least 30 m (100 ft.). For longer distances, a junction box may be employed. In this example, the buffered output (BUF OUT) is used as the input for the MCT enveloped acceleration module. The MCT enveloped acceleration modules feature a jumper controlled constant current source (CCS) and are therefore the designated "slaves" in multi-parameter configurations.

The standard SKF MCT housing, which has complete provisions for holding up to four MCT's with companion monitor (alarm module) or six MCT's without monitor, can be ordered completely wired ready for installation and is ideal for monitoring fans and blowers.



Fig. 3. MCT transmitters without companion monitor (alarm unit).

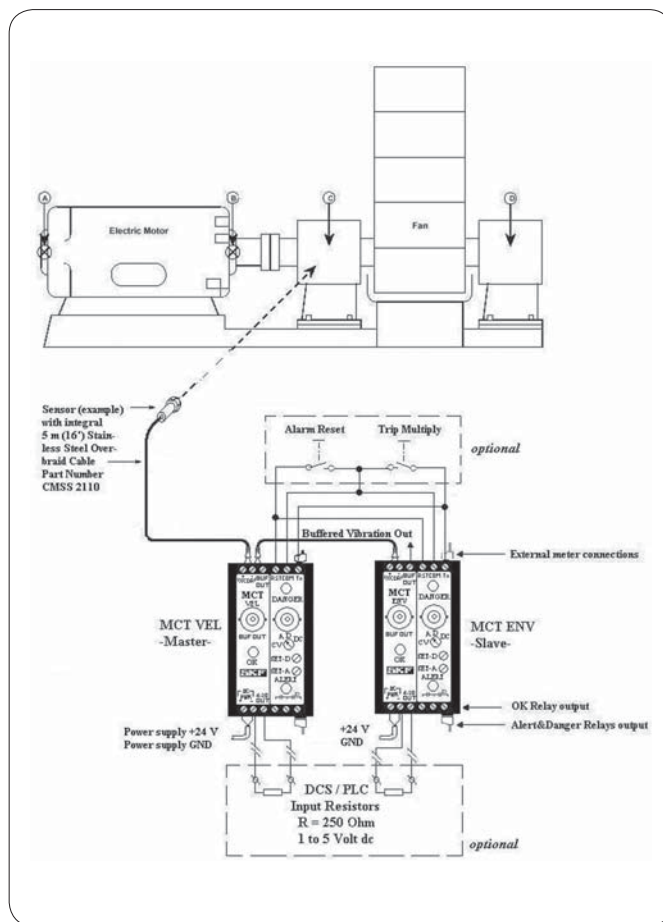


Fig. 4. Fan and blower, typical multi-parameter installation.

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