



HYDROELECTRIC POWER GENERATION

Detect Turbine Generator Faults with
Vibration Monitoring Instrumentation

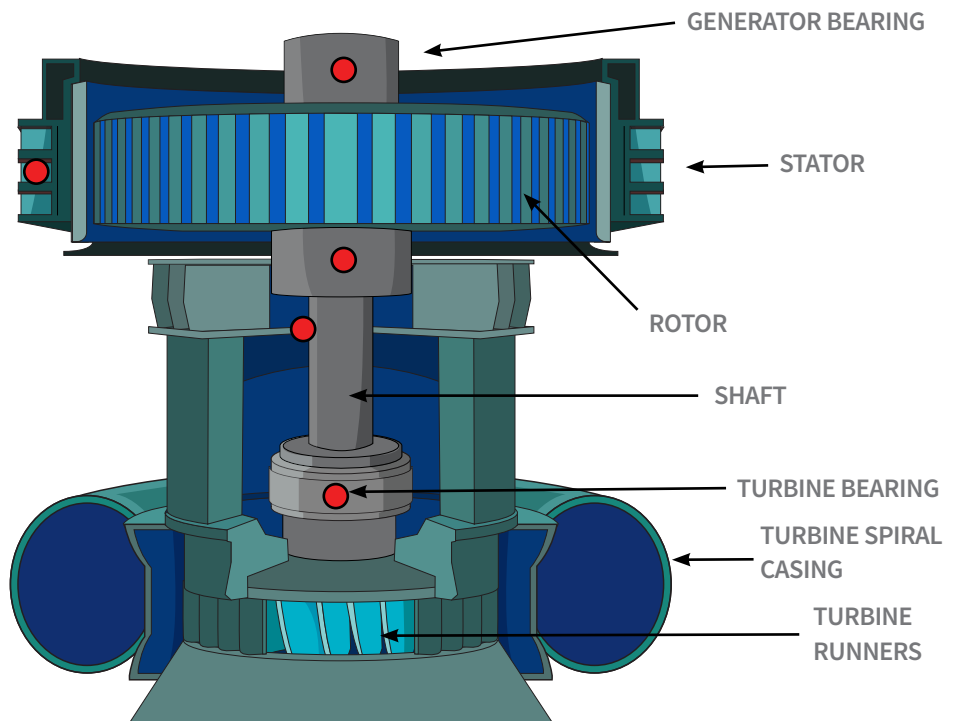


HYDROELECTRIC POWER GENERATION

The core of a typical hydroelectric power plant is the turbine. As water runs through the penstock on its way from the reservoir to the outflow, it circulates past the turbine runner. The water flow causes the runner blades to rotate, thereby turning the turbine shaft. The turbine shaft subsequently turns the generator shaft, creating electricity.

Hydro turbines rotate slowly, typically at an operating speed of 75 to 1000 rpm. Turbines are often required to operate at partial load in order to meet fluctuating electricity demands. This part load operation can increase the potential for water pressure pulsations, turbulence and cavitation. Runner components are prone to fatigue and damage because of the errant vibration caused by these fluctuations.

In addition to runner components, turbine and generator shafts and bearings are also prone to vibration. Those vibrations can be faults including unbalance, misalignment, bearing fatigue and/or overload and insufficient bearing lubrication.



● Suggested Sensor Placement



ICP® ACCELEROMETERS - Predictive Maintenance



LOW COST ICP® ACCELEROMETERS

Models 602D01 & M602D01

- Easy installation in tight spaces
- Through-bolt aides in cable orientation
- Low profile, less than 1 in. height
- M12 connector version available



LOW COST ICP® ACCELEROMETERS

Models 603C01 & M603C01

- General purpose, hermetically sealed
- IMI's most popular accelerometer
- Small footprint
- M12 connector version available



PRECISION ACCELEROMETERS

Models 622B01 & M622B01

- Full frequency sweep calibration: 5% sensitivity deviation tolerance
- 15 kHz high frequency response ideal for early detection of bearing fluting conditions
- Ideal for route-based data collection



PRECISION ACCELEROMETER WITH VELOCITY OUTPUT

Model VO622B01

- 100 mV/ips sensitivity
- 9 kHz high frequency response ideal for monitoring of slower speed equipment



PRECISION ACCELEROMETER WITH VELOCITY OUTPUT

Model VO625B01

- 100 mV/ips sensitivity
- 6 kHz high frequency response ideal for monitoring of slower speed equipment



PRECISION TRIAXIAL ACCELEROMETER

Model 639A91

- 13 kHz high frequency response on all three axes
- Extremely small footprint (0.95" x 0.95" excluding the side exit connector)



4-20 mA TRANSMITTERS - Process Monitoring & Protection

It is critical that hydro turbines operate reliably in order to meet the electricity demands of the power grid. Unscheduled shutdowns or failures result in costly downtime and equipment damage. Although maintenance engineers can't be everywhere at once, IMI® vibration and fault transmitters provide continuous protection and early detection of issues such as imbalance, bearing faults, bearing fluting and misalignment. Using a 4-20 mA signal, the transmitters directly communicate with customer PLC, PI, SCADA, or DCS systems and data can be easily trended, managed, with proper alerts and notifications to keep the electricity generation process up and running.



VIBRATION TRANSMITTER

Model 682C03

- Outputs 4-20 mA signal proportional to acceleration, velocity, or displacement
- ICP® accelerometer input
- Analog vibration output via front BNC



4-20 mA OUTPUT DISPLACEMENT SENSOR

Model 653A01

- Outputs 4-20 mA signal proportional to displacement
- 2 to 40 mil pk-pk measurement range
- 1.5 to 300 Hz frequency range



BEARING FAULT DETECTOR

Model 682C05

- Provides early warning of bearing and gear faults
- Operates with PLC, DCS, SCADA, alarm and control systems
- Outputs 4-20 mA signals for peak acceleration and overall vibration

PRODUCT SPOTLIGHT



PORTABLE VIBRATION CALIBRATOR

Models 699A06 & 699A07

- Small and completely self-contained, ideal for field check of accelerometers, velocity transducers and proximity probes.
- Ruggedized, weatherproof enclosure dramatically improves durability and portability
- Battery-powered unit offers extended life and enhanced protection against full discharge
- Precision quartz reference accelerometer and conditioning electronics for superior control and stability
- Rugged shaker element design with carbon fiber composite armature flexures
- Provides NIST traceable transducer verification across a wide frequency and amplitude range.



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IMI SENSORS designs and manufactures a full line of accelerometers, sensors, vibration switches, vibration transmitters, cables and accessories for predictive maintenance, continuous vibration monitoring, and machinery equipment protection. Products include rugged industrial ICP® accelerometers, 4-20 mA industrial vibration sensors and transmitters for 24/7 monitoring, electronic and mechanical vibration switches, the patented Bearing Fault Detector, high temperature accelerometers to +1300 °F (+704 °C), 2-wire Smart Vibration Switch, and the patented Reciprocating Machinery Protector. CE approved and intrinsically safe versions are available for most products.

THE INDUSTRY'S ONLY COMMITMENT TO TOTAL CUSTOMER SATISFACTION.