ABB MOTION SERVICES

**ABB Ability™ Digital Powertrain**
Condition monitoring of HV motor and generator powertrains fitted with ABB Ability™ MACHsense-R

ABB Ability MACHsense-R is a key element of the Digital Powertrain. It turns high voltage induction motors and synchronous motors and generators and their driven equipment into smart, wirelessly connected assets and helps to detect potential asset disturbances and plan maintenance before reliability, productivity and safety are impacted.

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**ABB Ability MACHsense-R**
ABB Ability MACHsense-R is a key element of the Digital Powertrain. It enables remote condition monitoring of high voltage induction motors and synchronous motors and generators and their driven equipment.

MACHsense-R collects data and transmits it to a secure cloud service. Advanced algorithms analyze the data, providing deeper insights into the condition and performance of the monitored asset. Potential machine disturbances and energy savings can be detected and actions taken to make operations more efficient, predictable and safe.

**Benefits**
- **Higher uptime** – Maintenance activities can be planned in advance to avoid unplanned downtime
- **Reduced maintenance costs** – Maintenance time and effort can be reduced with early warning system
- **Improved safety** – Enables safe access to equipment located in dangerous or hard to reach areas
- **Longer equipment lifetime** – Advanced maintenance planning supports longer powertrain lifetimes

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**ABB Ability Digital Powertrain**
The ABB Ability Digital Powertrain is a suite of digital solutions that enables you to remotely monitor the health and performance of powertrains, including drives, motors, generators and applications, such as pumps.

It combines data collected by MACHsense-R with data from other connected equipment. This data can be accessed and analyzed remotely, providing a better understanding of the maintenance needs and energy efficiency of the entire process.
Accessing information

Details on the asset’s status can be accessed through:

- **Web portal** – dashboard for operators to view condition and performance trends, access historical data, manage user access rights and set alerts and alarm.
- **App** – interface to the asset’s status for technicians on the factory floor. A ‘traffic light’ display gives an easy overview of the condition of all monitored assets.
- **Other systems** – MACHsense-R data can be easily integrated via API into other systems, such as ERP and SCADA systems.

Expert advice

While the data is always at your disposal, ABB can provide support to analyze the data and define the steps for improving your operations.

MACHsense-R

ABB Ability MACHsense-R is a premium data acquisition unit for HV motor and generator powertrains that can be configured with different sensor setups depending on the application.

- Vibration accelerometers (simultaneous sampling on eight channels)
- Magnetic field sensors
- Temperature measurements
Intended use
Motors and generators and their driven equipment, such as pumps and fans.

Motor and generator specifications
• 3-phase AC induction motors
• 3-phase synchronous motors and generators
• Continuous or intermittent duty
• Fixed speed or variable speed
• For shaft heights of 355 mm and higher

Monitored motor and generator health parameters
• Overall vibration (velocity rms)
• Drive end bearing condition
• Non-drive end bearing condition

Monitored motor and generator operating parameters
• Vibration in 3 axis on drive end and 1 axis on non-drive end
  - Acceleration RMS
  - Velocity RMS
  - Displacement RMS
  - Acceleration peak to peak
  - Acceleration kurtosis
• Speed (RPM)*
• Operating time
• Number of starts
• Motor supply frequency (Hz)
• Output power (hp/kW)*
• Operating load*
• Bearing temperatures (drive end, non-drive end)
• Winding temperatures (U, V, W)

Driven equipment specifications
• Rotating equipment, such as pumps and fans, in which temperature and vibration need to be measured and monitored

Monitored driven equipment health parameters
• Bearing condition

Monitored driven equipment operating parameters
• Vibration
  - Acceleration RMS
  - Velocity RMS
  - Displacement RMS
  - Acceleration peak to peak
  - Acceleration kurtosis
• Temperature

* only available for motors
**SPECIFICATIONS**

**Vibration measurements**
- **Frequency range**: 1 Hz to 50 kHz (configurable)
- **Resolution**: 24 bit A/D converter
- **Number of channels**: up to 16
- **Sampling rate (simultaneous sampling on 8 channels)**: 25.6 kHz
- **Frequency bandwidth**: 0.4 Hz - 13 kHz
- **Vibration sensors**: 100 mV/g accelerometer
- **Sensor positions (horizontal motor)**: DE Horizontal, DE Vertical, DE Axial, NDE Horizontal

**Temperature measurements**
- **Number of channels**: up to 8
- **Winding temperature (if internal RTDs are available)**: 2/3/4 wire PT100 inputs
- **Bearing temperature (external RTD required)**: 2/3/4 wire PT100 inputs

**Communication**
- **WLAN**: Wi-Fi 802.11 a/b/g/n/ac, Bluetooth® Low Energy 5.0 (IEEE 802.15.4)
- **WWAN**: Mobile LTE 4G, HSPA+ 3G
- **LAN**: 10/100 MBPS

**Power supply**
- **Voltage range**: 110 - 240 VAC
- **Frequency range**: 47 - 63 Hz

**Environmental**
- **Temperature**: -40 °C to +60 °C
- **IP class**: IP65
- **Vibration**: MIL810

**Certification/Standards**
- CE, RED, FCC, IC
- Safe areas only; no hazardous area certification

**Physical**
- **Dimensions (WxHxD)**: 459x240x173 mm
- **Data acquisition unit mounting**: On or near motor
- **Vibration and temperature sensor mounting**: E.g. bearing positions, motor body, driven equipment
- **Magnetic field sensor mounting**: Motor body