# Service Catalogue
Customer Support & Service Activities

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MACHINERY PROTECTION SYSTEM CHECK

MAIN BENEFITS

- Ensures your system is 100% functional and working safely
- Extends the lifetime of your system
- Helps optimize spare parts management.

INTRODUCTION

The correct specification and operation of machinery protection systems (MPSs) is essential in order to ensure the correct, safe and reliable operation of your assets. Although vibro-meter equipment does not require (re)calibration, it is appropriate to perform general vibration (and other) system checks for key installations, as part of periodic maintenance activities.

SCOPE AND PURPOSE

Our Customer Support & Service Team can help with the following activities:

- MPS configuration checks for VM600 and/or VibroSmart systems
- Protection function checks such as relay triggering, analog outputs / fieldbus outputs simulation
- Signal checks against a distributed control system (DCS) or programmable logic controller (PLC)
- Sensor function checks such as static and dynamic response of vibration sensors
- Onsite sensor calibration for accelerometers, velocity probes, proximity probes, etc.
- Configuration improvements

COMMENTS AND RECOMMENDATIONS

We recommend that these activities are performed during routine outage periods, as the protection systems will be available for testing during this time. For critical assets, such as gas turbines, some of these activities are usually carried out on a regular 2 year basis (based on ISO standards). For less critical machines, such as balance of plant (BOP), some customers check the protection system on a regular 10 year basis. In some cases, customers take this opportunity to refurbish the complete vibration system (sensors, conditioners, cabling and protection systems) in parallel with an upgrade of the control system, generally on a regular 20 year basis. Nowadays, this approach is often considered in order to help extend the lifecycle of an asset (power plant, refinery, oil platform, etc.).
EXAMPLES

During maintenance activities in a combined-cycle power plant, our Customer Support & Service Team:

- Tested all measurement chains with appropriate calibration tools (shaker)
- Prepared calibration reports and established the list of sensors to be replaced (out of specification)
- Simulated sensor measurements by injecting calibration signals (at the junction boxes, conditioner level) in order to verify the complete transmission chain
- Verified amplitude measurements of the MPS
- Simulated, warning and trip thresholds of the MPS
- Verified relay and analog outputs to the DCS

In total, approximately 20 sensors were dismounted, tested and re-installed.
The customer scheduled a mechanical technician to help with dismounting activities.
All on-site activities were completed in 4 days, with the help of an on-site site instrumentation and control (I&C) engineer.
INTRODUCTION

Commissioning machinery monitoring equipment in accordance with the required recommendations and procedures is a delicate and crucial phase of a project, and should never be underestimated. Just because best in class instruments and technologies have been selected, it does not mean that the story ends. Without a proper installation, an accurate verification of all the functions and features, and a documented protocol of tests, nobody can guarantee that the new equipment will work safely and reliably.

Obviously, vibro-meter knows our own products and equipment better than anybody else. We are trained and experienced in the commissioning of measurement chains, machinery protection and condition monitoring systems, in many different environments worldwide.

SCOPE AND PURPOSE

- **Installation**
  - Sensors and measurement chains (signal conditioners, cabling, etc.)
  - VM600 racks and VibroSmart modules
  - Junction boxes, enclosure and cabinets
- **Installation inspection**
- **Wiring checks**
- **Cold commissioning** (signal checks)
- **Sensor tests**
- **Hot commissioning**
- **Site acceptance tests** (SATs)
- **Special tests**
  - Machine trial run
  - Dynamic tests
  - Performance tests
- **Training** (see the Customer Training section for more details).

Our Customer Support & Service Team are equally happy commissioning vibro-meter portfolio and third-party products.
**COMMENTS AND RECOMMENDATIONS**

To make the best use of our Field Service Engineers, it is good practice to combine commissioning activities with a SAT and training.

**EXAMPLES**

For a large hydro project, vibro-meter field engineers worked closely with our local distributor who took charge of the installation of measurement chains and VM600 system, with wiring performed according to project drawings. During the commissioning phase, one of our Field Service Engineers travelled to site to inspect the installation work, finalize minor open points and put in service the machinery protection and condition monitoring systems. Sensors were individually tested, signals, protection functions and outputs were individually simulated according to commissioning protocol.

A run-up test with real signals was recorded, which allowed the fine tuning of the VibroSight configuration. A special report was prepared as a baseline for future machinery reports. In addition, customer training was provided to maintenance users. On-site activities, covering approximately 20 measurement channels, were performed in 1 week.
INTRODUCTION

Condition monitoring systems (CMSs) have gained more and more interest over the last few years, especially for critical assets. These systems are evolving quickly, adding new features that increase user productivity and improve overall system performance (higher resolution, amount of data, speed of retrieval, interfacing options, etc.). However, many vibro-meter users are still relying on older condition monitoring systems based on the **VM600 CMS software** and **CMC16 + IOC16T cards**. These systems are becoming obsolete, with difficult to replace hardware, and some are still running on out-of-date computers and operating systems which may cause security concerns. The latest generation of CMS from vibro-meter, based on the **VibroSight software** and **XMx16 + XIO16T modules**, will dramatically improve your machinery maintenance work, by providing you with more data and more useful information in order to help you make the correct decisions at the right moments.

SCOPE AND PURPOSE

Our Customer Support & Service Team can help you with the following CMS upgrade activities:

- **VibroSight upgrade**
  - Take advantage of the speed and power of the latest versions of **VibroSight 5.x** (faster and more powerful **server/database** structure compared to VibroSight 2.x or earlier)
  - Add new features and functionality to your system
    - Seamless data processing and logging at 100 ms,
    - Remote monitoring and diagnostics with HDA (historical data archive) export/import,
    - OPC UA server,
    - Rolling-element bearing analysis

- **VM600 CMS to VibroSight upgrade**
  - **XMx16 + XIO16T modules** can be installed in the same VM600 rack as the MPS, without any impact (that is, MPS and CMS “segregation”)
  - **Configuration upgrade**: equivalent or improved system configuration can be prepared in advance in the office, in order to minimize the transition time.
  - **Mimic project upgrade**
  - **CMS data migration to VibroSight compatible data format**
  - **Computer upgrade** (see the [IT/OT Services](#) section for more details).
COMMENTS AND RECOMMENDATIONS

We strongly encourage users to upgrade existing condition monitoring systems to VibroSight based systems, an activity that requires limited machine downtime (less than 1 hour). We also recommend users to keep VibroSight systems up to date with the software release schedule, so that they can benefit from the latest features and improvements.

EXAMPLES

For an oil & gas drilling platform, combining power generation units (gas turbines), pumps and compressors (balance of plant), the original condition monitoring system was upgraded with VM600 machine monitoring system using VibroSight software. This CMS monitors a total of 32 different machines, using 16 VM600 racks and 26 XMV16 cards, with more than 300 dynamic channels.

When first upgraded to a VM600 system in 2015, VibroSight version 2.12.4 was used. Then, in 2020, the system was upgraded again to VibroSight 4.1.3.

When using VibroSight 2.12.4 (2015), two VibroSight servers/databases, running on two separate server computers were required. Following the subsequent upgrade to VibroSight 4.1.3 (2020), the configuration now runs on a single VibroSight server/database on a single modern and powerful server computer located offshore, while delivering improved levels of performance.

Thanks to the HDA export/import feature, a second VibroSight server/database is replicated on an onshore virtual cloud computer, simplifying access to and analysis of vibration data for the multiple VibroSight users at the client’s maintenance center. Also during the 2020 upgrade, the configuration (data logging rules) was improved to provide better data resolution, especially during transient machine states. The configuration was prepared in advance in the office (1 week of work) in order to minimize the deployment time. Deployment, verification and final tuning of the configuration, together with dedicated customer training was executed remotely from onshore in 5 days.
MAIN BENEFITS

• Vibro-meter field engineers take care of your project from start to finish!
• Optimize costs and get the most appropriate solution.

INTRODUCTION

With many recent actors in this area, we know that turnkey solutions and customer focus is an important differentiator when it comes to winning projects. This is particularly true for end-users, who in some cases do not have the experience or the engineering resources to carry out a project. Accordingly, vibro-meter field engineers can manage your project; with project services including:

• **Design of a new fully configured machinery monitoring systems**
  - Machinery protection system (MPS)
  - Condition monitoring system (CMS)
  - VM600 racks and cabinets
  - VibroSmart modules and enclosures.

• **Retrofit** of an existing machinery monitoring system
  - MMS to VM600 and/or VibroSmart
  - VSM8xx to VibroSmart
  - VM600 to VM600Mk2
  - Third-party systems to vibro-meter systems

• **Extension** of a machinery protection system to also include condition monitoring
• Addition of measurement points (for example, to also include balance of plant (BOP) equipment)
• **Pilot projects**, normalization of custom solution packages.

SCOPE AND PURPOSE

• **Support end-users on all project stages and even after:**
  - **Site survey:** review of a complete system, analysis of project requirements or necessary modifications
  - **Proposal** phase: assist sales during the clarification of the scope of supply
  - **Engineering** phase:
    - Specification
    - Prototyping
    - Project planning
    - Development
    - Integration with third-party system

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- Validation, testing and certification
  o **Manufacturing** phase:
    - Production and configuration of devices
    - Assembly of cabinets and enclosures
  o **Factory acceptance tests** (see the Factory Acceptance Test section for more details)
  o **Installation** phase: supervision of local partners on-site
  o Cold and hot **Commissioning** (see the Commissioning section for more details)
  o **Site acceptance tests**
  o System **maintenance** (see the Long Term Service Agreement section for more details)
  o Lifetime **support** on-site.

**COMMENTS AND RECOMMENDATIONS**

We understand how important turnkey solutions are for you. By combining our high quality products and value added engineering skills, we can deliver a solution that fulfils your expectations and helps achieve your project scope. We encourage you to contact us to discuss pilot projects and concept developments.
FACTORY ACCEPTANCE TESTS

MAIN BENEFITS

• Customers ensure the system works according to the specifications and are configured correctly. While this may seem obvious, it is very important for more complex projects in which many parties are involved and changes can happen during the project design and engineering phase.

INTRODUCTION

Providing high quality solutions that are quickly installed and immediately functional on-site is an important differentiator when it comes to winning projects. Whether for small or large projects, quality planning, factory tests and detailed acceptance reports are a key element of customer satisfaction. Whether from its factory in Fribourg, its various sales offices across the globe or at customer premises, vibro-meter field engineers can organize, carry out and provide assistance for key witness point activities such as:

• Factory acceptance tests (FATs)
  o Checks of sensor calibration
  o Configuration tests of machinery protection systems (MPSs)
  o Configuration tests of condition monitoring systems (CMSs)
  o Configuration tests of overspeed detection systems (ODSs)
  o Integration in cabinets

• Integrated factory acceptance tests (IFATs) at customer premises
  o Integration of machinery monitoring system (MPS, CMS or ODS) with control system or DCS
  o Integration in cabinets

SCOPE AND PURPOSE

Our Customer Support & Service Team can help you with the following activities:

• Factory acceptance tests
  o Preparation of customized documentation: FAT procedure, test report format, etc. are prepared according to applicable standards and agreed with customers before the witness test
  o Organisation of logistics: helping to organize travel visas, accommodation, etc.
  o Preparation of all necessary material for a smooth test: collecting the material and the documentation from our production department, preparing all signal generators and measuring devices needed for the FAT
  o Factory acceptance tests, including:
    - Review with customers of all production certificates, machinery monitoring system signal list, FAT procedure
    - Visual inspection of the material
    - Testing of the sensors: sensitivity check, frequency curve, etc.
• Changing system configuration during FAT is much more effective in terms of time, and avoids time consuming and costly modifications later on during on-site commissioning.

• Customers get a first “touch” of their measurement chains and/or machinery monitoring system and start to learn how to use it.

- Testing of the machinery monitoring system according to agreed signal list and FAT procedure, including mandatory safety functions (relays)
- Testing and visualization of monitoring system software as per the agreed FAT procedure

  ○ Reporting and follow-up:
  - Final test report with all necessary certificates and documentation
  - Managing the list of all agreed changes during FAT, so that they are correctly implemented by production before material shipping
  - Creation of an open points list and coordination with engineering and sales and project

• Integrated factory acceptance tests, including:
  ○ Preparation of customized documentation: similar to FAT, according to applicable standards and in accordance with customer requirements
  ○ Integrated factory tests: similar to FAT, interface between machinery monitoring system and third-party systems (DCS, control system) tested as per IFAT procedure, with a strong accent on safety functions (relays) and communication protocols (for example, Modbus)
  ○ Reporting and follow-up: similar to FAT, extended IFAT report, coordination with production, engineering, sales and project team as needed, follow-up of punch point list.

COMMENTS AND RECOMMENDATIONS

We all know how important preparation is. Combining our expertise in sensors and machinery monitoring with the customer’s machine and project expertise throughout the FAT process helps to tackle issues upfront, thereby ensuring a smooth and quick FAT, and subsequent on-site commissioning. For large projects where many similar systems need to be delivered, or for new machine validation, we recommend making a FAT / IFAT on the first system, before starting the production of the others. In order to obtain the maximum benefit from a FAT, why not combine it with training on vibro-meter portfolio?

EXAMPLES

While doing a FAT for an oil & gas customer, the functional safety tests did not work according to the customer’s expectation. In fact, due to various project contingencies, the FAT at our premises had been postponed a number of times. Meanwhile, the end-user had changed the protection concept and system configuration, but this information had not been communicated to us. However, thanks to the FAT, we could correct the safety functions according to the new concept, document the changes and make sure that all of the other racks were configured according to the same protection concept. This avoided hundreds of hours of work which would otherwise have been required later on during the commissioning, thereby saving money ensuring a smooth project execution.
ADVISORY AND CONSULTANCY SERVICES

MAIN BENEFITS

- Take advantage of over 65 years of vibro-meter experience and expertise in this domain
- Design new machinery protection and/or condition monitoring solutions for machines that have no protection
- Assess if existing machinery monitoring solutions are 100% functional and working safely
- Fingerprint campaigns to optimize machine operation and performance in terms of vibration.

INTRODUCTION

We would like to share our knowledge of and passion for machinery vibration, pressure and speed measurement and monitoring with the rest of the world. Every day, thousands of machines are rotating in numerous facilities for many different applications in order to help provide the comforts that we all expect from life in the 21st century. For the maintenance managers responsible for these machines, vibration is their common concern because high vibration levels can generate problems and eventually cause accidents. So don’t rely on fate, take the right action and investigate that vibration!

SCOPE AND PURPOSE

Our Customer Support & Service Team can help you with the following activities:

- Prepare/review engineering/project specifications
- Site survey
- Field supervision: installation, field check and tests
- Vibration campaign (site tests): data logging with portable devices (VM600 1U rack with a XMx16+XIO16T module)
- Vibration analysis and diagnostics: reports and assessment (see the Analysis and Diagnostics section for more details)
- Balancing
- Predictive maintenance: VibroSight diagnostics rule box software
- Rental of diagnostic equipment
- Customized reporting tools (Python library for dedicated analysis)

COMMENTS AND RECOMMENDATIONS

Vibro-meter Field Service Engineers are trained (ISO 18436-2) and equipped to help you with field activities. Some end-users already benefit from long term service agreements with us that include regular inspection and analysis of vibration data. We encourage you to contact us and discuss your requirements with our experts.
LONG TERM SERVICE AGREEMENT

MAIN BENEFITS

• Can include VibroSight support and maintenance options
• Can include VibroSight upgrade options
• Continuous development and implementation of new features
• Regular analysis and reports
• Keeps your machinery monitoring system up and running.

INTRODUCTION

In principle, machinery monitoring systems should work continuously to provide reliable data for analysis and decision making. While, for the special case of a machinery protection system (MPS), the system should always be available to automatically initiate the safe shutdown (“trip”) of the machine, if this becomes necessary. But in practice, how many systems are left alone without maintenance? And how many times does it happen that when data is required, it is discovered that the system was switched off or had not actually been working for the last few months?

We understand that this can be a delicate subject for some users, who don’t have the resources to take care of a monitoring system or don’t have the knowledge to assess the status of their machines. In situations such as these, vibro-meter field engineers are available to help, support and guide you. For example, we could check and maintain your system to ensure that it is always running, up-to-date with the latest improvements, and even prepare regular reports assessing the health of your assets. Such service agreement contracts will guarantee you dedicated resources in case of maintenance and support, troubleshooting, general questions and clarifications – by telephone and email, remotely or on-site, during office hours or even 7/7. More customized service contracts can be set up in order to better meet your needs and expectations.

SCOPE AND PURPOSE

• Dedicated service for the maintenance and support of machinery monitoring systems
  o In case of maintenance and support, troubleshooting, general questions and clarifications
  o Can include regular system upgrades
  o Can include yearly site visit and training
  o On-site or remotely (VPN connection, cloud based solution, etc.)
• Can be focused on condition monitoring systems (VibroSight)
• Regular verification of the status and performance of the condition monitoring system
• Regular preparation of reports (basic/advanced) on a weekly/monthly/quarterly basis
  o Suitable for analysis and diagnostic services (customized reports)
• Dedicated support by telephone and email: 7/7 days.
COMMENTS AND RECOMMENDATIONS

Long term service agreements (LTSAs) are recommended for end-users that want to extensively benefit from vibro-meter field engineers know-how and experience. We care about our systems around the world and we do our best to keep customers satisfied and loyal. At the same time, we benefit from field feedback and exchanges with users which help us to improve our products.

EXAMPLES

Over the years, we have signed multiple long term service agreements, almost every one with a dedicated scope of supply. Customer feedback has been positive, so we understand the correct direction to go in and levels of support to include.

For some users, the agreement/contract is limited to maintenance and support of a VibroSight condition monitoring system, with an option for on-site/remote system upgrade. Such a simple contract may account for 40 hours of services per year.
CUSTOMER TRAINING

MAIN BENEFITS

- At Meggitt offices, customer offices or on-site
- Remote training: webinars
- Customized training content
- Official training from vibro-meter experts
- Vibration CAT II certified trainers
- Various levels of exam for your employees
- Certificate of completion and/or examination results.

INTRODUCTION

The training phase is an important part of each project. Users require a good knowledge of a product to fully benefit from it. We know that this is crucial, so we like to share our knowledge with our customers. Regular training sessions are organized for distributors and partners. Dedicated training courses are organized for end-users and OEMs with dedicated agendas and content, as required. Demonstration shows, events, refresh trainings, remote training sessions (webinars), and live training at our offices or your premises can also be organized with a little notice.

SCOPE AND PURPOSE

- Dedicated training for any vibro-meter portfolio product
  - Front ends (sensors and measurement chains)
  - Machinery protection systems (MPSs)
  - Condition monitoring systems (CMSs)
  - VM600 and VM600Mk2
  - VibroSmart
  - VibroSight
- Cybersecurity concerns
- Customized vibration monitoring training, such as machine analysis and diagnostic using VibroSight tools
- Customized gas turbine combustion training, such as machine analysis and diagnostic using VibroSight tools.

COMMENTS AND RECOMMENDATIONS

We recommend that users of vibro-meter equipment are trained appropriately, so that you get the highest levels of performance from our products, systems and solutions. A range of standard training material is available and can easily be adapted to specific training agendas, as required.
EXAMPLES

A typical training for technical users such as service/maintenance/application engineers includes measurement chains, machinery protection and condition monitoring topics, and typically requires 5 days. This include multiple hands-on sessions to practice and become familiar with multiple tools (especially VibroSight). Several live demonstrations are also included, using our rotor-kit or synthetic signals to demonstrate transient states and explore advanced condition monitoring features.

Less detailed training for less technical users such as sales engineers, project managers and plant supervisors typically requires 3 days. Mixed technical/sales content can also be organized, with real application exercises, for example, product selection, quotation, installation and commissioning. Other customized agendas, content and/or exams can be organized depending on your needs.
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