

DATA SHEET

vibro-meter®

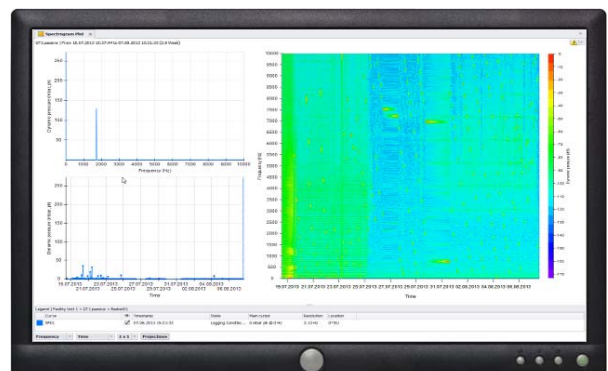
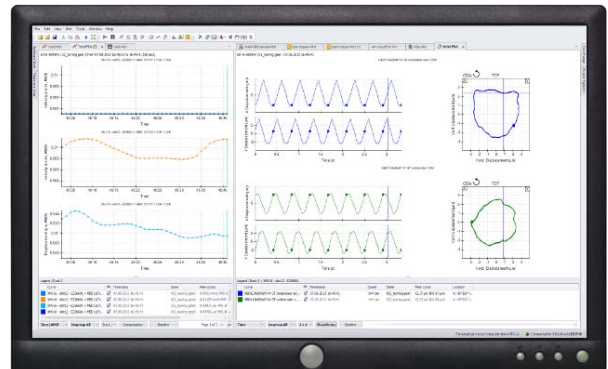
VibroSight®
machinery monitoring
system software



VibroSight
Machinery Protection &
Condition Monitoring
Software

KEY FEATURES AND BENEFITS

- From the vibro-meter® product line
- Compatible with VM600^{Mk2}, VM600 and VibroSmart® machinery monitoring systems
- Supports VM600^{Mk2} machinery protection and condition monitoring systems: MPC4^{Mk2} + IOC4^{Mk2}, RLC16^{Mk2} and CPUM^{Mk2} + IOCN^{Mk2}
- Supports VM600^{Mk2}/VM600 condition monitoring systems: XMV16 + XIO16T, XMC16 + XIO16T and CPURx + IOCRx
- Supports VibroSmart® distributed monitoring systems (DMSs): VSV30x + VSB300, VSI010 + VSB010 and VSN010
- Automatic data acquisition and storage
- Alarm limit checking and event logging
- Online and offline data visualisation and analysis
- Fast and powerful, user-friendly software modules with a graphical user interface
- Machinery analysis project management
- Tightly-integrated data management



KEY BENEFITS AND FEATURES (continued)

- Proprietary VibroSight databases with optimised data handling for the fastest data retrieval and display
- Runs on Windows® operating systems: Windows 11, Windows 10, Windows Server 2022 and Windows Server 2016



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APPLICATIONS

- Machinery vibration monitoring and analysis
- Rolling-element bearing analysis
- Hydro air-gap and magnetic-flux monitoring and analysis
- Dynamic combustion monitoring and analysis

DESCRIPTION

VibroSight[®] machinery monitoring system software

The VibroSight[®] machinery monitoring system software, from Meggitt's vibro-meter[®] product line, is a highly-integrated software suite that supports the effective monitoring of all rotating machinery.

Designed for operation with VM600^{Mk2}/VM600 rack-based systems and VibroSmart[®] distributed monitoring systems (DMSs), the VibroSight[®] software is an essential part of these machinery monitoring systems. The software is used for system configuration, operation and management and enables the predictive methodologies which can be used to optimise the operational efficiency of industrial machinery.

In particular, a VibroSight-based machinery monitoring system can be used to:

- Minimise downtime through the planning and scheduling of maintenance activities.
- Maximise component life by avoiding known critical operating conditions.
- Improve equipment reliability through the effective prediction of equipment failures.
- Use condition monitoring techniques to maximise equipment performance.

When used by technicians, operators and engineers, VibroSight enables them to identify a problem rapidly, evaluate the situation and determine the appropriate action to take in order to protect machinery and reduce operating costs.

Machinery monitoring system operation

The VibroSight[®] software is designed to be easy to use: from the configuration of parameters and measurements for the machinery being monitored, to automated data acquisition and signal processing, and the display of data to assist in the advanced analysis and diagnosis of industrial machinery (using VibroSight Vision).

The configuration of the system depends on the actual machinery monitoring system hardware used and the machinery monitoring application. For example:

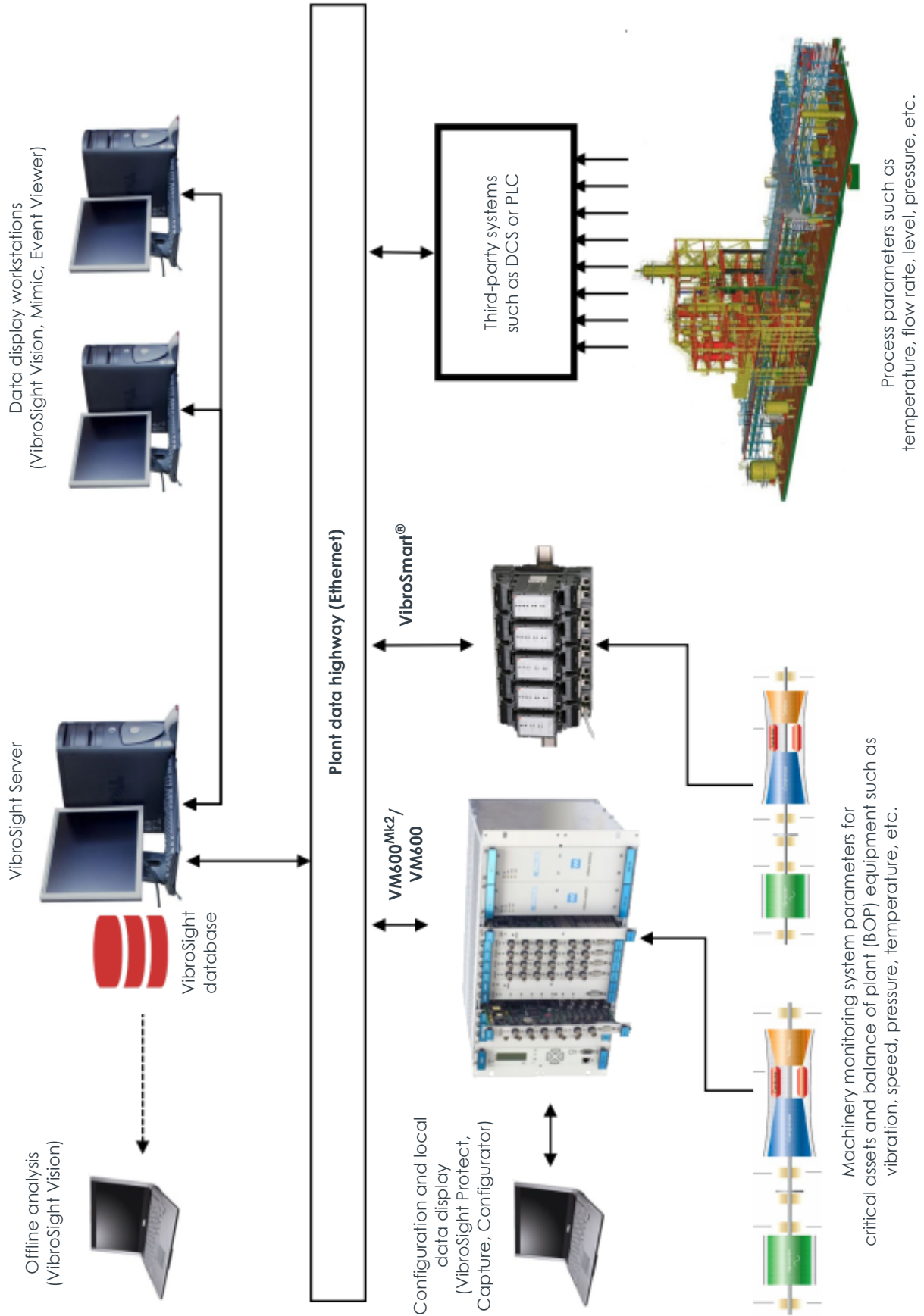
- VibroSight Protect is used to configure VM600^{Mk2} systems (MPC4^{Mk2} + IOC4^{Mk2}, RLC16^{Mk2}, CPUM^{Mk2} + IOCN^{Mk2}) for machinery protection (MPS) applications.
- VibroSight Capture is used to configure VM600^{Mk2} systems (MPC4^{Mk2} + IOC4^{Mk2}) for condition monitoring (CMS) applications.
- VibroSight Configurator is used to configure VM600 systems (XMx16 + XIO16T) for condition monitoring (CMS) applications and to configure VibroSmart[®] systems (VSV30x + VSB300, VSI010 + VSB010) for machinery protection (MPS) and/or condition monitoring (CMS) applications.

In general, with VM600^{Mk2}/VM600 and VibroSmart[®] systems, data acquisition is continuous with a typical measurement data update rate of 1 s (100 ms max.), there is extended alarm (severity state) handling with multiple alarms per output, and extended processing capabilities. In addition, VibroSight-based systems have the ability to adapt automatically to the criticality of the machinery being monitored by applying specific data logging scenarios, depending on machine operating conditions (machine states).

The VibroSight software takes advantage of industry standard platforms and runs on Windows 11, Windows 10, Windows Server 2022 and Windows Server 2016 operating systems. It uses a proprietary, highly-optimised system of VibroSight databases to ensure performance and enable tightly-integrated data management (compared to an off-the-shelf database). And it has an intuitive, fully graphical interface for ease of use.

An example application of a VibroSight-based solution is shown overleaf.

EXAMPLE APPLICATION

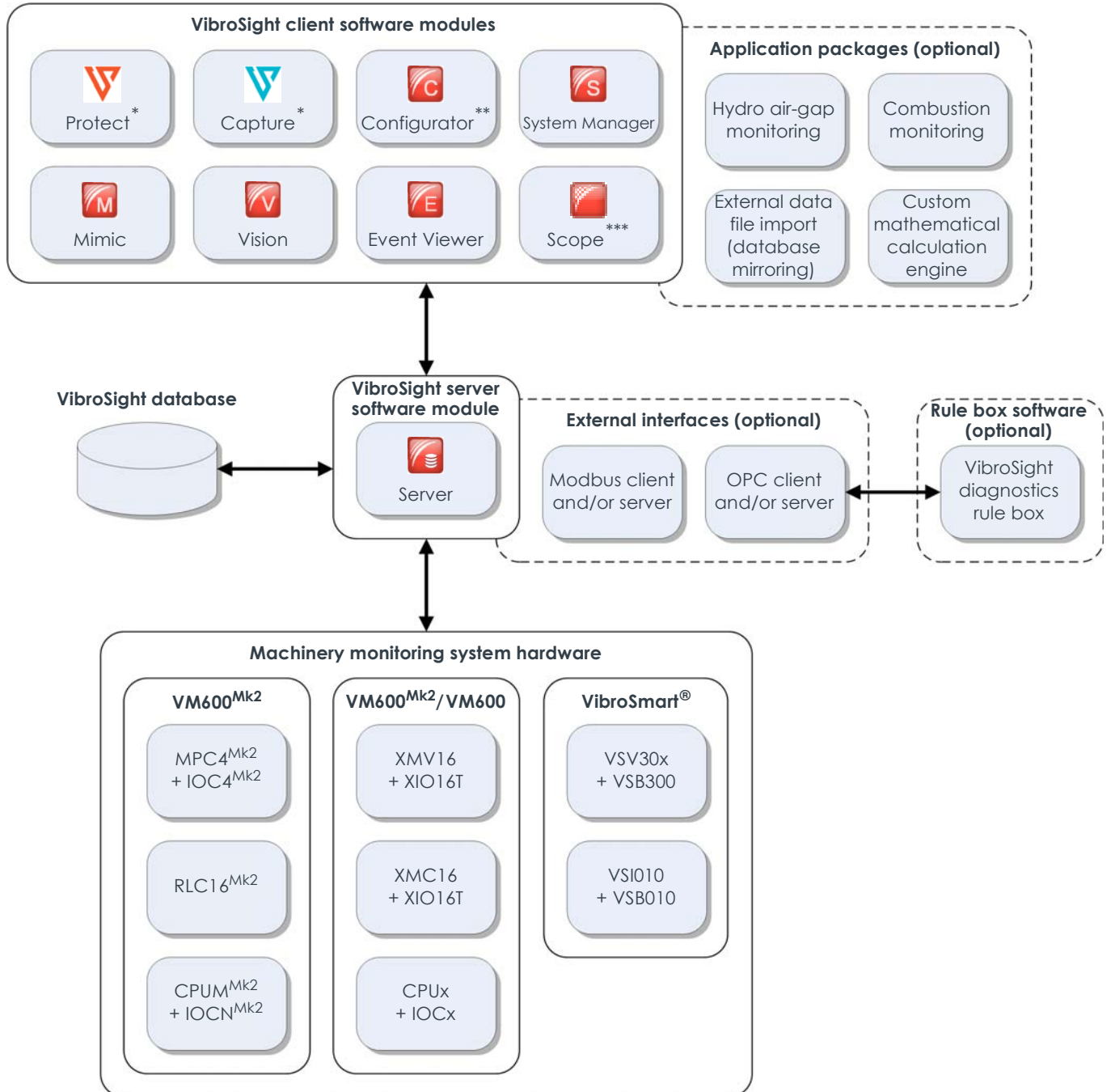


DESCRIPTION (continued)

VibroSight® software architecture

The VibroSight® software uses a truly modular design that adapts to different machinery monitoring applications.

As shown below, the software uses a predominantly client-server architecture to distribute the functional requirements and workload across different software modules and application specific packages.



*The VibroSight Protect software module is used to configure VM600^{Mk2} systems (MPC4^{Mk2} + IOC4^{Mk2}, RLC16^{Mk2}, CPU^{Mk2} + IOCN^{Mk2}) for machinery protection (MPS) applications, while the VibroSight Capture software module is used to configure VM600^{Mk2} systems (MPC4^{Mk2} + IOC4^{Mk2}) for condition monitoring (CMS) applications.
 **The VibroSight Configurator software module is used to configure VM600^{Mk2}/VM600 systems (XMx16 + XIO16T) for condition monitoring (CMS) applications and to configure VibroSmart® systems (VSV30x + VSB300, VSI010 + VSB010) for machinery protection (MPS) and/or condition monitoring (CMS) applications.
 ***The VibroSight Scope software module is used to display data from VibroSmart® systems only.

DESCRIPTION (continued)

Due to its modular client-server architecture, the VibroSight® software can run on a single host (stand-alone) computer or be distributed across a number of computers (multi-servers) connected to the machinery monitoring system hardware (VM600^{Mk2}/VM600 racks and/or VibroSmart® systems) by an Ethernet network. This allows configuration, acquisition, data visualisation and analysis, and troubleshooting tasks to be performed from a single location or distributed between several workstations.

Advantages of distributed configurations include allowing specific functions to be performed on dedicated computers by the appropriate personnel. Distributed configurations also enable remote data collection and analysis, allowing configuration and troubleshooting tasks to be performed via remote access if necessary.

For integration in industrial environments, VibroSight supports external interfaces that enable the exchange of data with third-party systems using industry standard protocols. For example, this enables the correlation of vibration data with other parameters that are already available from separate field devices, so that there is no need to remeasure.

VibroSight software modules, editions and application specific packages

VibroSight's software architecture consists of several software modules for use with VM600^{Mk2} modules, VM600 modules/cards and VibroSmart® modules and devices. This allows a range of VibroSight® software editions to be provided to meet the requirements of different machinery monitoring applications. Each software edition includes different software modules and also features application specific packages:

- Hydro air-gap monitoring – for the monitoring and analysis of hydroelectric generators.
- Combustion monitoring – for the monitoring and analysis of combustion chamber dynamic-pressure data.
- External data file import (database mirroring) – for the import of external data into VibroSight Servers (*.vshdf) using VibroSight historical data archive (*.vshda) files and/or CSV files.

- Custom mathematical calculation engine – to enable math post-processing on the data in VibroSight Servers (*.vshdf) in order to calculate and create new data and information.

It is important to note that the base/standard VibroSight® (that is, the VibroSight Classic edition) provides full support for vibration analysis, including a complete catalogue of plots and the functionality required for the display and analysis of absolute vibration, relative vibration, position, displacement, eccentricity expansion and so on. This is in addition to its included application specific package: Hydro air-gap monitoring. See **Software editions on page 18** for further information.

VibroSight external interfaces

VibroSight's external interfaces include industry-standard interfaces such as Modbus and OPC to enable data sharing between a VibroSight Server (*.vshdf) and third-party systems through the import and/or export of data.

Note: Once data is imported into VibroSight (from external systems), it is considered as VibroSight data and can be handled and treated in exactly the same way. For example, the data can be displayed and analysed using VibroSight Vision, logged into the VibroSight database (*.vshdf), re-exported, etc.

For VM600^{Mk2}/VM600 systems containing a CPUM^{Mk2} + IOCN^{Mk2} module or CPUx / IOCx module/card pair, data can equally be exported via industry standard fieldbuses such as Modbus or PROFIBUS.

Similarly for VibroSmart® systems containing a VSI010 + VSB010 module, data can equally be exported via Modbus, PROFIBUS or the IEC 61850 GOOSE protocol.

DESCRIPTION (continued)

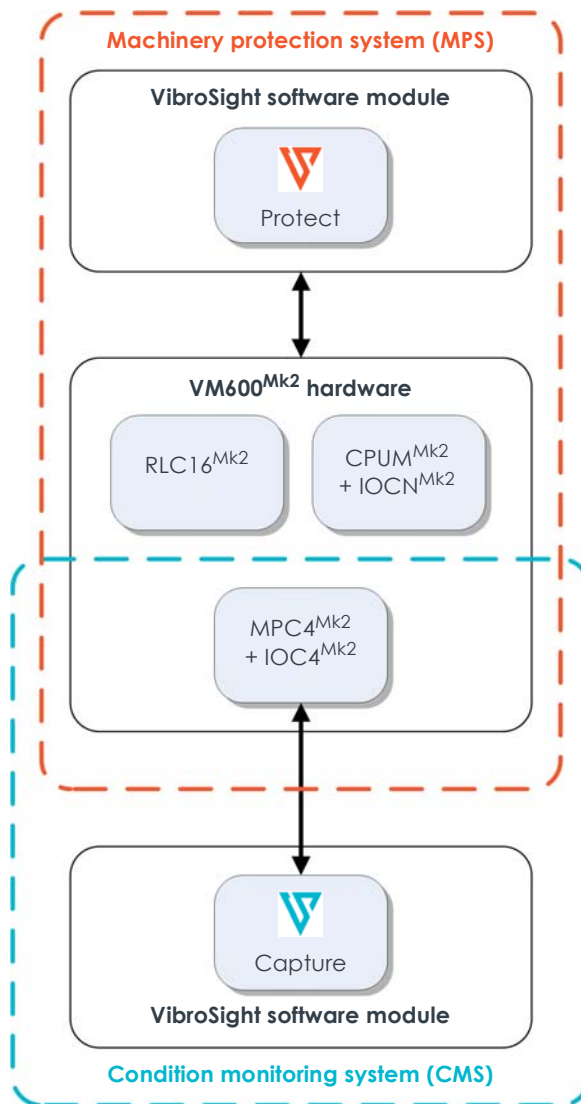
VibroSight® / VM600^{Mk2} systems

In VibroSight® / VM600^{Mk2} systems (that is, the second generation of VM600 rack-based systems), the MPC4^{Mk2} + IOC4^{Mk2} module can provide machinery protection system (MPS) functionality and/or condition monitoring system (CMS) functionality, depending on the requirements of the application.

As shown below, the VibroSight® software uses completely separate software modules for the

configuration and operation of VM600^{Mk2} systems depending on the functionality required:

- VibroSight Protect supports the configuration and operation of the machinery protection (MPS) functionality for a VM600^{Mk2} system.
- VibroSight Capture supports the configuration and operation of the condition monitoring (CMS) functionality for a VM600^{Mk2} system.



Using separate software modules (VibroSight Protect and Capture) for the configuration and operation of VM600^{Mk2} functionality/systems helps ensure complete separation (“segregation”) of MPS and CMS in a single VM600^{Mk2}/VM600 rack.

For example, a VibroSight / VM600^{Mk2} system consisting of MPC4^{Mk2} + IOC4^{Mk2} modules can initially be installed and used as a MPS only. Then, CMS functionality can be quickly and easily added at any time by upgrading the licenses for the MPC4^{Mk2} + IOC4^{Mk2} module(s) and for VibroSight software, as required.

DESCRIPTION (continued)

For the VM600^{Mk2} MPC4^{Mk2} + IOC4^{Mk2} machinery protection and condition monitoring module, machinery protection functionality is available by default for all versions of the module, while condition monitoring functionality is optional. Accordingly, MPC4^{Mk2} condition monitoring can be used by either (1) ordering a version of the module with condition monitoring enabled or (2) ordering and uploading a condition monitoring license to a version of the module without condition monitoring enabled (using VibroSight System Manager).

Note: MPC4^{Mk2} condition monitoring also requires a VibroSight[®] software edition / license that supports condition monitoring.

Hardware / system compatibility

For VM600^{Mk2} machinery protection applications, the VibroSight[®] software includes VibroSight Protect, which is designed specifically for operation with VM600^{Mk2} systems (that is, the second generation of VM600 rack-based systems) and modules:

- MPC4^{Mk2} + IOC4^{Mk2} module – machinery protection (MPS) functionality
- RLC16^{Mk2} relay module
- CPUM^{Mk2} + IOCN^{Mk2}.

For VM600^{Mk2} condition monitoring applications, the VibroSight[®] software includes VibroSight Capture, which is designed specifically for operation with VM600^{Mk2} systems (that is, the second generation of VM600 rack-based systems) and modules:

- MPC4^{Mk2} + IOC4^{Mk2} module – condition monitoring (CMS) functionality.

For VM600^{Mk2}/VM600 condition monitoring applications, the VibroSight[®] software is designed to take advantage of the extended processing capabilities and high data throughput of the VM600^{Mk2}/VM600 XMx16 extended condition monitoring modules:

- XMV16 + XIO16T for vibration monitoring
- XMVS16 + XIO16T for vibration monitoring
- XMC16 + XIO16T for combustion monitoring.

VibroSight[®] is also used for the configuration of any CPUx / IOCRx rack controller and communications interface modules/card pairs, if used.

For VibroSmart[®] machinery protection and/or condition monitoring applications with lower channel counts, the VibroSight[®] software supports the following VibroSmart[®] modules and devices:

- VSV30x + VSB300 monitoring modules
- VSI010 + VSB010 communications interface module
- VSN010 real-time Ethernet switch.

Applications information

As part of a VM600^{Mk2}/VM600 and/or VibroSmart[®] solution, the VibroSight machinery monitoring software is ideal for the monitoring and protection of critical assets such as gas, steam and/or hydro turbines, other high-value rotating machines, as well as balance of plant (BOP) equipment such as compressors, gearboxes, motors, pumps and fans.

The VibroSight[®] software is fast and powerful: so fast, that it has to be seen to be believed. Even higher channel count applications monitoring a large numbers of assets from a single database pose no problem. In practice, this makes VibroSight[®] easier to use and results in quicker data analysis.

For further information, contact your local Meggitt representative.

PRODUCT HIGHLIGHTS

The VibroSight® software incorporates the following main product features and benefits:




<p>VibroSight databases</p>	<p>VibroSight uses VibroSight databases – a specialised system of files designed and optimised for the high-speed storage and retrieval of data generated by high-performance machinery monitoring systems.</p> <p>VibroSight databases use a proprietary database (data repository) system, consisting of VibroSight historical data folders (* .vshdf) for handling and logging of data by a VibroSight Server, and VibroSight historical data archives (* .vshda) for display, analysis and sharing of historical data without a VibroSight Server.</p> <p>Compared to systems using off-the shelf databases, the combination of VibroSight databases and the optimised data handling implemented by VibroSight result in a system that:</p> <ul style="list-style-type: none"> • Is fully adapted to the data handling needs of high-performance machinery monitoring systems. • Is much faster than a standard database. • Is very responsive when analysing large quantities of data. • Requires less storage (disk space) and memory to store, work with and share the same quantity of information. • Integrates seamlessly.
<p>Fully-integrated data management</p>	<p>VibroSight includes fully-integrated support for VibroSight database management that simplifies the configuration and operation of the database backup, database purge and management of offline data storage.</p> <p>This extremely easy to use data management configuration means that no external data/database management tools are required.</p>
<p>VibroSight Vision for easy data analysis</p>	<p>VibroSight Vision offers exceptional data handling and visualisation capabilities so that it is effortlessly fast for the display and analysis of data.</p> <p>It includes a complete catalogue of plots with cursor synchronisation that allows all of the information relevant to a particular event or time period to be more easily displayed for even quicker analysis.</p> <p>Data from multiple VibroSight databases (* .vshda) can be worked with at the same time using simple drag and drop operations in order to more easily compare present and historical data across multiple sites and time periods.</p> <p>Rapid, optimised zooming in plots encourages the discovery of additional data/plot features. For example, the Long Waveform plot can be used to display all measurement points in a continuous long-duration waveform – making the analysis of machinery data so much easier.</p> <p>Whenever a plot is updated in VibroSight Vision, VibroSight automatically processes (“filters”) the measurement data using super-fast algorithms in order to optimally select the data points required to accurately display the data in the plot.</p>
<p>Transient machine states</p>	<p>VibroSight supports transient machine states that automatically detect the typical machine states associated with the transitory operation of a machine, such as run-ups, run-downs, aborted run-ups and aborted run-downs. These transient machine states help to quickly identify relevant data for the analysis of transient conditions.</p> <p>Transient machine states are in addition to VibroSight's support for (standard) machine states which are used to identify the steady-state operation of machinery.</p>
<p>Corbit plot</p>	<p>VibroSight Vision includes the Corbit (cascaded orbit) plot type which displays multiple orbits on the same 3D plot as a function of time or speed, optionally with their waveforms. A Corbit plot typically consists of many individual orbits or filtered orbits superimposed one on top of another for the selected time range.</p> <p>Corbit plots can be used to quickly see and examine the overall envelope (shape) of an orbit to see how it changes against time or speed, for example, to examine a particular bearing. A Corbit plot can also display multiple orbits for multiple Orbit measurements, for example, in order to allow bearings to be investigated in more detail or compared.</p>

PRODUCT HIGHLIGHTS *(continued)*

Rolling-element bearing analysis	<p>VibroSight includes support for rolling-element bearing analysis as follows:</p> <ul style="list-style-type: none"> • Demodulation (envelope) signal analysis – a complex and detailed vibration waveform signal analysis that uses a dedicated demodulation spectrum to monitor and analyse frequency-specific measurements which are related to particular rolling-element bearing defects/failures frequencies (such as BPFI, BPFO, BSF and FTF). This technique detects problems in rolling-element bearings at the earliest possible opportunity, thereby allowing maintenance intervals and operational efficiency to be optimised. • Crest factor measurements – a simple indicative vibration waveform signal analysis that calculates the crest factor, a measurement which is related to general deterioration in a rolling-element bearing. This technique indicates problems in rolling-element bearings that have already developed, that is, much later than demodulation (envelope) signal analysis. <p>Note: Rolling-element bearing analysis can be used with VM600^{Mk2}/VM600 XMV16 modules and/or VibroSmart VSV30x modules.</p>
OPC HDA	<p>VibroSight includes support for OPC HDA (historical data access) so that a VibroSight OPC Server can be used to easily export data from a VibroSight Server (*.vshdf) to any third-party system with an OPC HDA client.</p> <p>In this way, data analytics applications can use tools such as MATLAB® and LabVIEW™ for further in-depth processing and analysis of VibroSight system data.</p>
OPC UA	<p>VibroSight includes support for OPC UA (unified architecture) so that a VibroSight Server can more easily export data from a VibroSight Server (*.vshdf) to third-party systems such as a DCS, PLC or data analysis tools.</p> <p>Advantages of OPC UA include platform independence, improved security, multiple properties per data item (tag), and easier system configuration and operation.</p> <p>Note: Support for OPC UA is in addition to the existing support for OPC Classic (OPC DA and OPC HDA).</p>
CSV data import	<p>VibroSight includes support for importing data from CSV files into a VibroSight Server (*.vshdf) in order to allow data from third-party systems such as other monitoring systems and/or process parameters from control systems (DCS or PLC) to be easily incorporated. This enables a single VibroSight plant-wide database that can take advantage of the speed and power of VibroSight for all machinery monitoring, remote monitoring and diagnostics.</p>
Cybersecure remote monitoring and diagnostics (VSHDA data source import)	<p>Remote VibroSight database (*.vshda) files can be imported into a local VibroSight Server (*.vshdf) in order to create a replica/mirror of the remote VibroSight system to support applications such as central diagnostics centres, with file generation, importation and synchronisation is performed automatically in quasi real-time.</p> <p>While primarily intended for working with remote monitoring systems installed in cybersecure environments (behind a "data diode" or firewall), this feature is also useful for remote sites that have unreliable network connections.</p>
Enterprise view	<p>VibroSight Vision, VibroSight Event Viewer and VibroSight Mimic support concurrent connections to multiple different VibroSight Servers at the same time in order to support applications such as central diagnostics centres.</p> <p>For example, this allows a single Enterprise level Mimic in a remote diagnostics centre to easily monitor machinery in different locations/sites from a single display.</p>
Agile software development	<p>The VibroSight software is developed using an Agile software development model which ensures the timely and regular (quarterly) delivery of continuously improving software.</p>
Separation of MPS and CMS	<p>Separate software modules (VibroSight Protect, Capture and Configurator) and system hardware (VM600^{Mk2} MPC4^{Mk2} and VM600^{Mk2}/VM600 XMx16) helps ensure complete separation ("segregation") of MPS and CMS in a VM600^{Mk2}/VM600 rack.</p>

SOFTWARE MODULES

The VibroSight software architecture consists of the following software modules:

 Protect	<p>VibroSight Protect is the client application software module used for the configuration and operation of VM600^{Mk2} systems for machinery protection applications (that is, the second generation of VM600 rack-based systems). That is, VibroSight Protect is used with VM600^{Mk2} systems containing:</p> <ul style="list-style-type: none"> • MPC4^{Mk2} + IOC4^{Mk2} modules, RLC16^{Mk2} modules (and any associated CPUM^{Mk2} + IOCN^{Mk2} module). <p>More specifically, VibroSight Protect is used for the configuration of basic rack/system information and the configuration of machinery protection specific measurements.</p>
 Capture	<p>VibroSight Capture is the client application software module used for the configuration and operation of VM600^{Mk2} systems for condition monitoring applications (that is, the second generation of VM600 rack-based systems). That is, VibroSight Capture is used with VM600^{Mk2} systems containing:</p> <ul style="list-style-type: none"> • MPC4^{Mk2} + IOC4^{Mk2} modules. <p>More specifically, VibroSight Capture is used for the configuration of condition monitoring specific measurements, creation and management of the VibroSight database/Server (*.vshdf), data logging rules, and data management. VibroSight Capture is also used to configure other system functionality such as external interfaces used to import data into VibroSight, for example, OPC and/or OPC UA devices (clients), and VSHDA data sources used for database mirroring.</p>
 Configurator	<p>VibroSight Configurator is the client application software module used for the configuration of VM600 rack-based machinery condition monitoring system (CMS) hardware and VibroSmart[®] distributed monitoring system (DMS) hardware. That is, VibroSight Configurator is used with VM600^{Mk2}/VM600 systems containing:</p> <ul style="list-style-type: none"> • VM600^{Mk2}/VM600 XMx16 + XIO16T modules (and any associated CPUx / IOCx modules/card pairs). • VibroSmart VSV30x + VSB300 modules, VSI010 + VSB010 modules (and VSN010 devices). <p>More specifically, VibroSight Configurator determines the required measurements from the machinery being monitored. The configuration of specific parameters for the machinery being monitored is also required, for example, in order to allow data logging and the capture of transients.</p> <p>VibroSight Configurator is also used to configure other system functionality such as external interfaces using industry standard protocols such as Modbus and OPC servers.</p>

Notes

VibroSight Protect is completely separate and distinct to VibroSight Capture and VibroSight Configurator in order to ensure the complete separation ("segregation") of machinery protection functionality and condition monitoring functionality in a VM600^{Mk2}/VM600 rack.

(For reference, VM600 system hardware (that is, the first generation (Mk1) of VM600), namely the MPC4 / IOC4T, AMC8 / IOC8T and RLC16 (and CPUM / IOCN) modules/cards are compatible with the VM600 MPSx software.)

SOFTWARE MODULES (continued)

 System Manager	<p>VibroSight System Manager is the client application software module that provides the tools to manage the machinery monitoring system hardware. System Manager is used to activate software, upgrade firmware, configure IP addresses and NTP server settings.</p>
 Mimic	<p>VibroSight Mimic is the client application software module that is used to provide an overview of the machinery being monitored, using live measurement data. Shortcuts in Mimic can also be used to automatically open VibroSight Vision and display a measurement in more detail. Different hierarchical views (Mimics) of the machinery being monitored can be created from a library of predefined objects, then customised and associated with specific measurements, using a simple to use drag-and-drop interface. For example, one object could display the current value of a measurement, while another object could change colour whenever a measurement exceeds a predefined alarm limit.</p>
 Vision	<p>VibroSight Vision is the state-of-the-art client application software module for the effective monitoring of machinery. It allows the live measurement data being streamed from VM600^{Mk2}/VM600 XMx16 modules and/or VibroSmart[®] modules and devices, and the measurement data stored in VibroSight databases (*.vshd.f and *.vshda) to be displayed. In Vision, a catalogue of plots are available to optimise the visualisation and analysis of measurement data, including waveforms, spectra and orbit plots (see Plots on page 15). The plots are fully customisable and navigation tools such as cursors, scaling and zooming facilitate the interpretation of the data.</p>
 Event Viewer	<p>VibroSight Event Viewer is the client application software module that is used to log and view the events stored in VibroSight databases. Such events may have been created automatically by the machinery monitoring system or defined by users. For example, Event Viewer can provides a comprehensive overview of alarms (severity states), which may have been triggered by factors such as excessive vibration levels in the machinery being monitored.</p>
 Scope	<p>VibroSight Scope communicates directly with a VibroSmart[®] distributed monitoring system, whether it is a single module or a network of multiple measurement blocks. Unlike most of the VibroSight software modules, which use a client-server architecture, Scope is a lite-client application that communicates directly with VibroSmart modules (bypassing VibroSight Server). Scope has a simplified user interface that allows the live static measurement data being streamed from VibroSmart modules to be displayed. It also allows the control and monitoring of DSI inputs such as alarm bypass (AB), alarm reset (AR) and trip multiply (TM).</p>
 Server	<p>VibroSight Server is the core server software module that interacts with all other parts of the machinery monitoring system. Server is the only software module to access the VibroSight historical data folder (*.vshd.f) used for data storage. All requests for information from a VibroSight Server (*.vshd.f), machinery monitoring system hardware and external device interfaces must pass through a Server. Server also manages the connections, data acquisition, alarms, data logging, licenses and verifies system access.</p>

BASE AND APPLICATION SPECIFIC PACKAGES

The base/standard VibroSight® software (VibroSight Classic edition) includes all of the features required for typical machinery vibration monitoring and analysis. That is, it provides full support for vibration analysis in order to monitor rotating machinery in a wide range of standard industrial applications.

In addition, optional application specific packages are available in order to process data optimally and improve data visualisation and analysis for specific industrial applications:

Optional application specific packages	
Hydro air-gap monitoring	Allows the air gap between rotor and stator, and the rotor and stator shapes (geometrical data) to be monitored for hydroelectric generators. Also allows the magnetic flux (magnetic flux density, also known as magnetic field strength) of the air gap to be monitored. Note: The Hydro air-gap monitoring package can be used with VM600 ^{Mk2} MPC4 ^{Mk2} modules, VM600 ^{Mk2} /VM600 XMV16 modules and/or VibroSmart VSV30x modules.
Combustion monitoring	Allows the combustion chamber with the maximum amplitude and frequency components to be quickly determined, and provides a clear view of the combustion instabilities for individual combustors. Note: The Combustion monitoring package can be used with VM600 ^{Mk2} /VM600 XMV16 modules.
External data file import (database mirroring)	Allows data import into a VibroSight system from VSDHA files and/or CSV files.
Custom mathematical calculation engine	Allows existing data in a VibroSight system to be combined in order to generate new data. It includes a basic mathematics library and an expression editor that are used to calculate the new data from existing measurement or system data.

Notes

The VibroSight Classic edition includes the following application specific package:

Hydro air-gap monitoring.

The VibroSight Premium edition also includes the following application specific packages:

Hydro air-gap monitoring, Combustion monitoring, External data file import (database mirroring) and Custom mathematical calculation engine.

(The VibroSight lite edition does not include any application specific packages.)

See **Software editions on page 18** for further information.

EXTERNAL INTERFACES

VibroSight can import data from external systems using industry standard interfaces. This allows data from third-party systems such as other monitoring and/or control systems (such as a DCS or PLC) to be easily centralised in a single database for ease of data management and/or to take advantage of the speed and power of VibroSight for the display and analysis of plant-wide data.

Equally, VibroSight can export its data using industry standard interfaces in order to share information with third-party systems.

The following interfaces are supported:

<p>Modbus TCP and/or Modbus RTU</p>	<p>The Modbus interface, a Modicon standard protocol for data exchange between software applications, allows data to be exchanged between the VibroSight and external devices that support the Modbus interface. Both Modbus RTU (serial connection) and Modbus TCP (Ethernet connection) are supported.</p> <p>VibroSight's Modbus interfaces can import data from Modbus data sources into a VibroSight database and/or export online values (current values and status) from a VibroSight database to external Modbus devices.</p> <p>VibroSight can act as a Modbus client and/or server.</p>
<p>OPC Classic and/or OPC UA</p>	<p>OPC (OLE for Process Control) is a set of specifications that provides a common interface for communications and the exchange of data between different products from different manufacturers over Ethernet networks. OPC uses a client-server architecture and a publisher-subscriber model in order to allow devices and programs to communicate and share data with each other.</p> <p>The original OPC specifications included OPC DA (data access), OPC HDA (historical data access) and OPC AE (alarms and events), which are now collectively referred to as OPC Classic. The more recent OPC UA (unified architecture) specifications take advantage of newer technologies and improved security. OPC UA includes all the functionality found in OPC Classic.</p> <p>VibroSight's OPC Classic interface can import data from OPC data sources into a VibroSight database and export online or historical values (values and status) from a VibroSight database to external OPC devices.</p> <p>VibroSight's OPC UA interface can export online or historical values (values and status) from a VibroSight database to external OPC devices.</p> <p>VibroSight can act as an OPC client and/or server, as follows: VibroSight OPC clients are compatible with OPC DA versions 2.05 and 3.0. VibroSight OPC servers are compatible with OPC DA versions 2.05 and 3.0, and OPC HDA versions 1.0, 1.1 and 1.2. VibroSight OPC UA client and servers are compatible with OPC UA.</p>
<p>PROFIBUS DP</p>	<p>PROFIBUS is a standard for industrial field buses defined by PI (PROFIBUS and PROFINET) International, an umbrella organisation responsible for both the PROFIBUS and PROFINET protocols. It allows the exchange of data between the VibroSight and external devices that support PROFIBUS DP (decentralised peripherals).</p> <p>VibroSight's PROFIBUS DP interface requires a VM600 CPUR2 / IOCR2 rack controller and communications interface module/card pair in spare slots of the VM600 rack in order to support real-time bi-directional data communication in a master-slave (client-server) arrangement.</p> <p>The VM600 rack acts as a PROFIBUS server (slave) device, while internally, Modbus data is exported from a VibroSight database and transmitted to external devices via the CPUR2 / IOCR2 module/card pair.</p>

EXTERNAL INTERFACES *(continued)*

VSHDA data source	<p>VSHDA files are VibroSight historical data archive (*.vshda) files, that is, a proprietary file format used to store, share and work with historical measurement data in VibroSight.</p> <p>VSHDA files are typically used to share (import/export) data between VibroSight systems, typically for the purposes of data visualisation and analysis.</p> <p>For the purposes of External data file import (database mirroring), VibroSight imports data from VSHDA files by treating them as an external data source with a dedicated input directory/folder. VibroSight monitors the input folder for VSHDA files and will automatically parse and add the file's data to a VibroSight Server (*.vshdf) in chronological order.</p>
CSV files	<p>CSV files are comma-separated values file, that is, delimited text files that use commas to separate values.</p> <p>CSV files are typically used to share (import/export) data between programs that store data in tables, such as databases or spreadsheets, including some legacy machinery monitoring systems.</p> <p>VibroSight imports data from CSV files by treating them as an external data source with a dedicated input directory/folder. VibroSight monitors the input folder for CSV files and will automatically parse and add the file's data to a VibroSight Server (*.vshdf) in chronological order.</p>

Notes

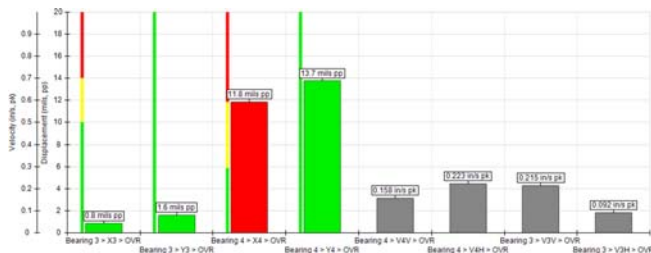
Once imported into VibroSight, data from external / third-party systems is considered as VibroSight data and can be handled and treated in exactly the same way for the purposes of data logging, display and analysis. For example, imported data can be displayed live in VibroSight Vision and/or logged to a VibroSight Server (*.vshdf), subsequently re-exported, etc.

PLOTS

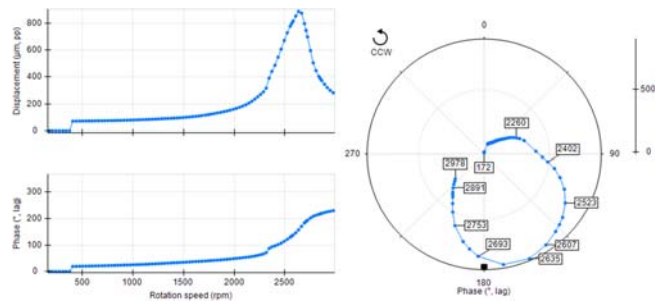
The following types of plot are included as standard in the VibroSight Vision catalogue of plots:

- Static plots: Bar Chart, Bode, Correlation, Polar, Shaft Centerline, Spider, Table and Trend
- Dynamic plots: Corbit (cascaded orbit), Orbit, Polar Waveform, Spectrogram, Spectrum, Full Spectrum, Waterfall/Cascade, Full Waterfall/Cascade, Waveform and Long Waveform

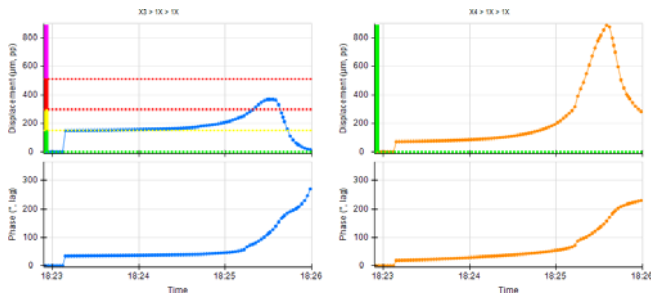
Bar Chart plot



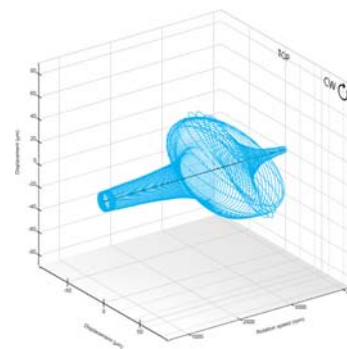
Polar plot



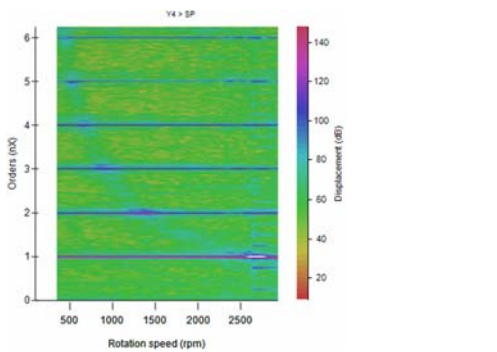
Trend plot



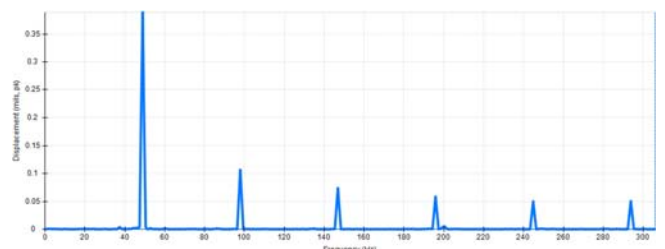
Corbit (cascaded orbit)



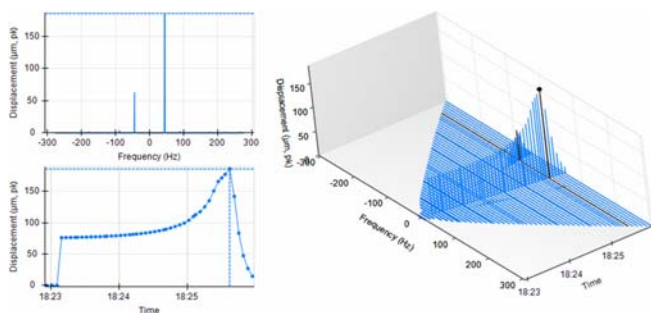
Spectrogram plot



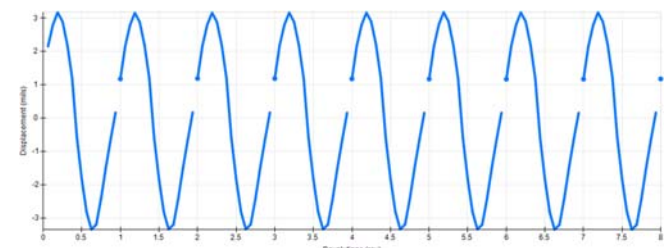
Spectrum plot



Waterfall/Cascade plot



Waveform plot



COMPATIBLE HARDWARE

VM600^{Mk2} rack-based systems for machinery protection and condition monitoring, consisting of:

- MPC4^{Mk2} + IOC4^{Mk2} machinery protection and condition monitoring modules
- RLC16^{Mk2} relay modules
- CPUM^{Mk2} + IOCN^{Mk2} rack controller and communications interface module.

Note: For reference, VM600 system hardware (that is, the first generation (Mk1) of VM600), namely the MPC4 / IOC4T, AMC8 / IOC8T and RLC16 (and CPUM / IOCN) modules/cards are compatible with the VM600 MPSx software.

VM600^{Mk2}/VM600 rack-based systems for condition monitoring, consisting of:

- XMV16 + XIO16T condition monitoring module for vibration
- XMVS16 + XIO16T condition monitoring module for vibration
- XMC16 + XIO16T condition monitoring module for combustion
- CPUR2 / IOCR2 (and CPUR / IOCR) rack controller and communications interface modules/card pairs.

VibroSmart[®] distributed monitoring systems (DMSs) for machinery protection and/or condition monitoring:

- VSV30x + VSB300 monitoring modules
- VSI010 + VSB010 communications interface module
- VSN010 real-time Ethernet switch.

PRODUCT MAINTENANCE AND SUPPORT

VibroSight uses a perpetual (permanent) license scheme. In other words, there is no expiration date for a license and therefore the software can be used indefinitely.

All new VibroSight software packages (editions) include one year's product maintenance and support, which includes:

- Email and telephone support
- Software updates and upgrades.

Notes

When ordering a new VibroSight software package (edition), the default product maintenance and support period of one year can be increased by specifying and purchasing additional years of the product maintenance and support plan (ordering option code Dx). See the VibroSight software in **Ordering information – VibroSight software on page 19** for further information.

For existing VibroSight software packages, additional years of the product maintenance and support plan can also be purchased. See the VibroSight software maintenance and support renewal in **Ordering information – VibroSight software on page 19** for further information.

The product maintenance and support plan excludes specific application and configuration support, as well as upgrade support, but these services can be provided at an additional charge. Contact your local Meggitt representative for further information.

COMPUTER SYSTEM REQUIREMENTS

Typical computer configuration for standard machinery monitoring applications:

- 2.0 GHz or faster multi-core 64-bit (x64) processor
- 16 GB of system memory (RAM)
- 500 GB or more of available storage (disk space), preferably on a dedicated drive
- DirectX 11 graphics device
- 27" 1280x1024 (SXGA) high-colour (32-bit) display or better
- Gigabit Ethernet network interface adapter (card)
- CD/DVD optical drive, USB port and/or Internet access for software installation
- Optional 100 GB (or larger) backup media
- 64-bit Microsoft® Windows operating systems such as Windows 11, Windows 10, Windows Server 2022 or Windows Server 2016 with Microsoft .NET Framework 4.7.2 or later

Recommended computer configuration for demanding machinery monitoring applications, such as large-scale vibration projects and combustion projects:

- 3.0 GHz or faster multi-core 64-bit (x64) processor
- 32 GB of system memory (RAM)
- 1000 GB or more of available storage (disk space), preferably on a dedicated drive
- DirectX 11 graphics device
- 27" 1280x1024 (SXGA) high-colour (32-bit) display or better
- Gigabit Ethernet network interface adapter (card)
- CD/DVD optical drive, USB port and/or Internet access for software installation
- Optional 250 GB (or larger) backup media
- 64-bit Microsoft® Windows operating systems such as Windows 11, Windows 10, Windows Server 2022 or Windows Server 2016 with Microsoft .NET Framework 4.7.2 or later

Acceptable computer configuration for less demanding machinery monitoring applications:

- 2.0 GHz multi-core 32-bit (x86) processor
- 8 GB of system memory (RAM)
- At least 250 GB of available storage (disk space)
- DirectX 11 or higher graphics device
- 24" 1280x1024 (SXGA) high-colour (32-bit) display
- Gigabit Ethernet network interface adapter (card)
- CD/DVD optical drive, USB port and/or Internet access for software installation
- 64-bit Microsoft® Windows operating systems such as Windows 11 or Windows 10 with Microsoft .NET Framework 4.7.2 or later

Notes

Windows 8.1 and Windows Server 2012 are no longer recommended as Microsoft® mainstream support for these operating systems ended in 2018 (and extended support will end in 2023).

Windows 7 and Windows Server 2008 R2 are no longer recommended as Microsoft® support for these operating systems ended in 2020.

SOFTWARE EDITIONS

The VibroSight® software is available in different editions that support various combinations of features and functionality, as follows:

		VibroSight editions			
		Lite	Classic	Premium	Client
Features and functionality	Handling of static measurement data Measurement data (variables), alarms (severity states) and events	✓	✓	✓	✓
	Handling of dynamic measurement data*		✓	✓	✓
	Live measurement data server VibroSight Server for communication with VM600 ^{Mk2} MPC4 ^{Mk2} modules, VM600 ^{Mk2} /VM600 XMx16 modules and/or VibroSmart® modules	✓	✓	✓	
	Live measurement data display Display of live measurement data from VM600 ^{Mk2} MPC4 ^{Mk2} modules, VM600 ^{Mk2} /VM600 XMx16 modules and/or VibroSmart® modules	✓	✓	✓	✓
	Live measurement data display* Waveforms and Spectra only	✓	✓	✓	✓
	Live measurement data display All other plot types**		✓	✓	✓
	Historical measurement data logging	✓	✓	✓	
	Historical measurement data display	✓	✓	✓	✓
	Bar Chart, Table and Trend plots	✓	✓	✓	✓
	All other plot types**		✓	✓	✓
	Hydro air-gap monitoring		✓	✓	
	Combustion monitoring			✓	
	External data file import (database mirroring)			✓	
	Custom mathematical calculation engine			✓	
	Additional Client licenses		✓ (1)	✓ (3)	
	Modbus client/server tags For data import/export		✓	✓	
	OPC (Classic/UA) client/server tags For data import/export		✓	✓	
	Suitable for stand-alone computer applications/ installations	✓	✓	✓	✓
	Suitable for multi-server computer applications/ installations		✓	✓	

Notes

The main difference between VibroSight Lite and VibroSight Classic is that VibroSight Lite is intended for machinery protection only applications (that is, it is compatible with hardware that supports machinery protection only), while VibroSight Classic is intended for machinery protection and/or condition monitoring applications (that is, it is compatible with hardware that supports both machinery protection and condition monitoring).

* Handling of dynamic measurement data and Live measurement data display: VibroSight Lite's use of VibroSight Vision to display live waveforms and spectra direct from modules is intended to support the configuration, verification and troubleshooting of sensor / measurement chains only. VibroSight Classic or VibroSight Premium (and a VibroSight Server) are required in order for VibroSight Vision to display and analyse dynamic measurement data for condition monitoring.

** All other plot types: For a complete list of supported plot types, see **Plots on page 15**.

ORDERING INFORMATION – VIBROSIGHT SOFTWARE

To order the VibroSight® software, please specify:

Type	Designation	Ordering number (PNR)
VibroSight	VibroSight® machinery monitoring software for the configuration, operation and management of VM600 ^{Mk2} /VM600 and/or VibroSmart® machinery monitoring systems:	
	– VibroSight software license Notes Electronic delivery (for example, via email/FTP). The VibroSight software must be accessed and installed separately.	608-001-000-001/Codes
	– VibroSight software Notes Physical media (USB device (flash drive/key)) with the VibroSight software to be installed. (If physical media is not required, then the VibroSight software can be accessed via FTP.) The VibroSight software license must be ordered separately.	609-010-000-001
	– VibroSight Discover edition software license Notes Electronic delivery (for example, via email/FTP). The VibroSight Discover edition license is intended for the purposes of demonstration/evaluation only and consists of: - Client-server suite for machinery protection (MPS) and/or condition monitoring system (CMS) applications - Capable of handling live and historical data for both static and dynamic measurements - All VibroSight data handling, plots and features. The Discover edition license is suitable for stand-alone computer installations and will automatically cease to function at the end of the fixed demonstration/evaluation period. When ordering, the ordering option code -xx is used to specify the required demonstration/evaluation period in months from 1 month (-01) to 6 months (-06) max.	609-009-000-001-xx
	– VibroSight software maintenance and support renewal Notes Used to purchase a number of additional years of product maintenance and support for an existing VibroSight installation/license. When ordering, the ordering option code -xx is used to specify the required maintenance and support period in years from 1 year (-01) to 3 years (-03) max.	652-003-000-001-xx

Notes

To order a new VibroSight software license, use the ordering option codes explained on the next page to specify a complete ordering number (PNR) in the format: 608-001-000-001/Axx-Bxxxx-Cxx-Dx. For example, a complete ordering number for a new software license for a VibroSight Lite edition is: 608-001-000-001/A01-B0-C0-D0.

To order a VibroSight software maintenance and support plan renewal, use the ordering option codes xx to specify the number of years of support (01, 02 or 03) required. For example, a complete ordering number (PNR) to renew a product maintenance and support plan for 3 years is: 652-003-000-001-03.

While it is compatible with the VibroSight® machinery monitoring system software, the VibroSight® diagnostics rule box software is a separate product that must be ordered separately (see **Related products on page 24**).

ORDERING INFORMATION – VIBROSIGHT SOFTWARE *(continued)*

VibroSight® software license (PNR 608-001-000-001/Codes) ordering option codes:

Code	Feature	Values	Description
A	Software edition and order type	01	<p>VibroSight Lite Client suite for machinery protection system (MPS) applications: – Capable of handling live data for static measurements only – VibroSight Vision Trend and Bar Chart plots only – VibroSight Mimic – Unlimited channels for VM600^{Mk2} and VibroSmart. Note: VibroSight Lite is intended for machinery protection only applications.</p>
		02	<p>VibroSight Classic Client-server suite for basic condition monitoring system (CMS) applications: – All VibroSight Lite capabilities plus ... – Capable of handling live and historical data for both static and dynamic measurements – All VibroSight Vision plots – All VibroSight software (server and clients) – Includes the Hydro air-gap monitoring application specific package – 1 × network client for network and offline client user. Note: VibroSight Classic is intended for machinery protection and/or condition monitoring applications.</p>
		03	<p>VibroSight Premium Client-server suite for advanced condition monitoring system (CMS) applications: – All VibroSight Classic capabilities plus ... – Includes the Combustion monitoring, External data file import (database mirroring) and Custom mathematical calculation engine application specific packages – 3 × network clients for network and offline client users.</p>
		04	Software edition upgrade: VibroSight Lite to Classic
		05	Software edition upgrade: VibroSight Lite to Premium
		06	Software edition upgrade: VibroSight Classic to Premium
		07	CMS channels license quantity enhancement A07 is used with Bxxx to increase the number of CMS channels supported by an existing VibroSight software license.
		08	VibroSight condition monitoring client suite (for network and offline client users)
		09	VibroSight Protect configuration software package for VM600 ^{Mk2} and VibroSmart systems. Note: Physical media (USB device (flash drive/key)).
		10	VibroSight Protect configuration software package for VM600 ^{Mk2} and VibroSmart systems Note: Electronic delivery (for example, via email/FTP).

ORDERING INFORMATION – VIBROSIGHT SOFTWARE *(continued)*

VibroSight® software license (PNR 608-001-000-001/C Codes) ordering option codes *(continued)*:

Code	Feature	Values	Description
B	Number of CMS channels	0 to n	Used to specify the total number of dynamic channels (vibration and/or combustion) required to be supported for condition monitoring (CMS) applications. Notes: The condition monitoring features and capabilities of CMS channels depends on the VibroSight software edition (VibroSight Lite, Classic or Premium) and the underlying monitoring system hardware (VM600 ^{Mk2} MPC4 ^{Mk2} , VibroSmart VSV301 and/or VM600 ^{Mk2} /VM600 XMx16). VibroSight Lite (A01) and ordering option codes A08-A10 do not support CMS channels, so require that B0 is specified (that is, the number of CMS channels must be zero for these software editions and order types). VibroSight Classic (A02) and VibroSight Premium (A03) support CMS channels, so any number of channels can be specified (that is, there is no upper limit to the number of CMS channels that can be supported).
C	Number of additional client access licenses	0 to 99	Used to specify the number of additional client access licenses required to support network client and offline client users. Notes: Ordering option codes A07-A10 require that C0 is specified (that is, the number of additional client access licenses must be zero for these software editions and order types).
D	Years of additional product maintenance and support	0 to 3	Used to specify the number of additional years of the product maintenance and support plan. Notes: When ordering a new VibroSight software package (A01-A03), a default product maintenance and support period of one year is included. Ordering option codes A04-A10 require that D0 is specified (that is, additional years of product maintenance and support can only be specified and purchased when ordering a new software edition).

Notes

Ordering option codes A01-A03 for the different VibroSight software editions (VibroSight Lite, Classic or Premium) are typically used for new installations/licenses.

VibroSight Lite (A01) is suitable for machinery protection system (MPS) applications only (compatible with VM600^{Mk2} MPC4^{Mk2} and VibroSmart VSV301). VibroSight Lite can be installed on a stand-alone computer (that is, all VibroSight software installed on one computer).

VibroSight Classic (A02) and VibroSight Premium (A03) editions are suitable for machinery protection system (MPS) and/or condition monitoring system (CMS) applications (compatible with VM600^{Mk2} MPC4^{Mk2}, VibroSmart VSV301 and VM600^{Mk2}/VM600 XMx16). VibroSight Classic and VibroSight Premium can be installed on a stand-alone computer and/or multi-server computers. For example, the VibroSight Server can be installed on one computer and the VibroSight software clients can be installed on other computers, depending on the required solution/system architecture.

Ordering option code A07 is used to increase the number of CMS channels (that is, dynamic vibration and/or combustion channels) supported by an existing VibroSight software license. For example, if a VibroSight software license was ordered with support for 64 × CMS channels (for example, PNR 608-001-000-001/A02-B64-C0-D0), then ordering option code A07 (and Bxxxx) can be used to enhance the existing license to increase the number of CMS channels supported. For example, PNR 608-001-000-001/A07-B16-C0-D0 in this case would add 16 × CMS channels to give a total of 80 × CMS channels.

(Notes continued on the next page ...)

ORDERING INFORMATION – VIBROSIGHT SOFTWARE *(continued)*

(Notes continued from the previous page ...)

Ordering option code B (0 to n) is used to specify the number of CMS channels (that is, dynamic vibration and/or combustion channels) required to be supported by a new VibroSight Classic (A02) or VibroSight Premium (A03) software license. (When specifying the number of CMS channels, auxiliary channels configured as tachometer/speed or DC inputs, and dedicated tachometer/speed channels are not counted.)

There is no upper limit on the number of CMS channels that VibroSight can support, so it is possible to order a VibroSight software license with any number of condition monitoring channels, which can then be used as required by a system/solution. In practice, this means that a single VibroSight software license is now purchased with a fixed number of condition monitoring channels (code B, "Number of CMS channels"), which the customer can then allocate/split between the number of VibroSight Server instances that best serves their solution requirements. We will provide the number of license files required to support the servers as long as the total number of condition monitoring channels does not exceed the purchased quantity.

For example, if $500 \times$ CMS channels are purchased, a single VibroSight Server can use all 500, or one VibroSight Server can use 100 while another server uses 400, and so on.

For the VM600^{Mk2} MPC4^{Mk2} + IOC4^{Mk2} machinery protection and condition monitoring module, machinery protection system (MPS) functionality is available by default for all versions of the module, while condition monitoring system (CMS) functionality is optional. Accordingly, MPC4^{Mk2} condition monitoring can be used by either (1) ordering a version of the module with condition monitoring enabled or (2) ordering and uploading a condition monitoring license to a version of the module without condition monitoring enabled. Refer to the VM600^{Mk2} MPC4^{Mk2} + IOC4^{Mk2} machinery protection and condition monitoring module data sheet for further information.

Note: MPC4^{Mk2} condition monitoring also requires a VibroSight software edition / license that supports condition monitoring.

ORDERING INFORMATION – VIBROSIGHT COMPUTERS

VibroSight® is available pre-installed on a range of different computer systems.

To order a computer with the VibroSight® software pre-installed please specify:

Type	Designation	Ordering number (PNR)
VibroSight computer	Computer with VibroSight pre-installed	601-005-000-001/Cx

Notes

Details of the different VibroSight computers (Cx) are given in the table below.
For example, a complete ordering number is 601-005-000-001/C1.

	VibroSight computer systems			
	C1 "Blackbox"	C2 "Desktop"	C3 "Workstation"	C4 "Rackmount"
Ordering number (PNR)	601-005-000-001/C1	601-005-000-001/C2	601-005-000-001/C3	601-005-000-001/C4
Brand / family	Kontron / KBox C-102	HP Inc. / HP EliteDesk 800 G3 Tower PC	HP Inc. / HP Z440 Workstation	Hewlett Packard Enterprise (HPE) / HPE ProLiant DL360 Gen10 server
Form factor	Industrial computer platform for control cabinet applications	Tower	Tower	1U rack
Computer	Kontron KBox C-102 – customised	HP 800 G3 – customised	HP Z440 – customised	HPE ProLiant DL360 Gen10 server
Processor	Intel® Core™ i7-6820EQ	Intel® Core™ i7 or i5	Intel® Xeon® E5 2600 or E5 1600	Intel® Xeon®-Silver 4112
System memory (RAM)	32 GB DDR4	Up to 64 GB DDR4 (4 DIMM slots)	Up to 256 GB DDR4 (8 DIMM slots)	16 GB DDR4 (24 DIMM slots)
Storage	1 × 256 MB mSATA SSD internal (operating system). 1 × 512 GB 2.5" SSD. 1 × 1 TB 2.5" HDD.	Up to 2 TB 3.5" SATA. Up to 1 TB SATA SSHD. Up to 512 GB 2.5" SATA SSD. Up to 1 TB 2.5" HDD. Up to 1 TB 3.5" SSHD. Optical disc drive (ODD) – optional. <i>Note: 1 × 2.5" HDD, 2 × 3.5" HDD and 1 × 5.25" internal drive bays; 1 × slim external (ODD) drive bay.</i>	Up to 600 GB SAS. Up to 1.2 TB SAS. Up to 4 TB SATA. Up to 500 GB SATA SED. Up to 2 TB SATA SSD. Up to 512 GB SATA SE SSD. Up to 1 TB SATA SSHD. Optical disc drive (ODD): slim SATA DVD-ROM, DVD-Writer or Blu-ray writer. <i>Note: 2 × 3.5" internal drive bays; 2 × 5.25" and 1 × slim external (ODD) drive bays.</i>	1 × 240 GB SFF (2.5") SATA SSD. 1 × 480 GB SFF (2.5") SATA SSD. 1 × 2 TB SFF (2.5") SATA SSD. <i>Note: Smart modular disk controller (8 lanes / 2 GB cache).</i>

ORDERING INFORMATION – VIBROSIGHT COMPUTERS *(continued)*

Ordering number (PNR)	VibroSight computer systems <i>(continued)</i>			
	C1 “Blackbox”	C2 “Desktop”	C3 “Workstation”	C4 “Rackmount”
Graphics	Intel HD Graphics 530 (integrated)	Intel HD Graphics 630, 610 or 530 (integrated). NVIDIA® GeForce® or AMD Radeon™ graphics card.	NVIDIA® or AMD graphics card (2D or 3D)	---
Interfaces	3 × 10/100/1000 MBit/s Ethernet. 2 × USB 3.0, 2 × USB 2.0. 1 × DisplayPort (DP). 1 × RS-232.	1 × Gigabit Ethernet (GbE). 4 × USB 3.1, 2 × USB 2.0. 2 × DisplayPort (DP). 1 × RS-232 – optional.	1 × Gigabit Ethernet (GbE). 4 × USB 3, 2 × USB 2.0. 1 × RS-232 – optional.	4 × Gigabit Ethernet (GbE).
Operating system	Windows 10 IoT	Windows 10 Pro 64	Windows 10 Pro 64	Windows Server 2016
Mounting	Control cabinet key holes, book size format	N/A	N/A	19" rack
Other	Maintenance-free design without any fans or batteries. +24 V _{DC} power supply.	---	---	Enterprise server. High-performance fans with fan redundancy. 96 W smart storage battery (to backup the write cache content onto flash memory controllers in case of an unplanned server power loss).
Application	Industrial computer for harsh environments	Less powerful computer for standard machinery monitoring applications (smaller systems)	More powerful computer for more demanding machinery monitoring applications (larger systems)	Server computer for the most demanding machinery monitoring applications (larger, data intensive systems)

RELATED PRODUCTS

VibroSight diagnostics rule box

VibroSight® diagnostics rule box software

: Refer to corresponding data sheet

Meggitt SA software

LICENCE AGREEMENT

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