

DATA SHEET

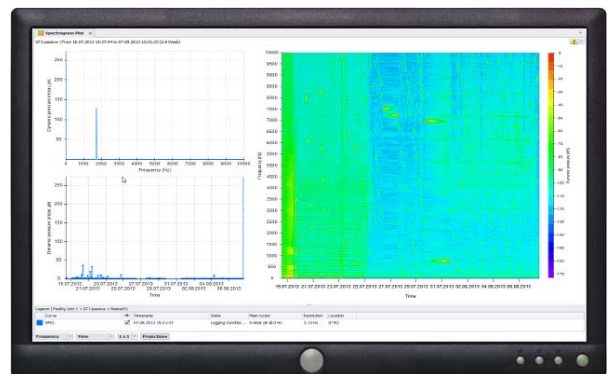
vibro-meter®



VibroSight®
machinery monitoring
system software

KEY FEATURES AND BENEFITS

- From the vibro-meter® product line
- Compatible with vibro-meter® VM600 and VibroSmart® machinery monitoring systems
- Supports VM600 rack card pairs: XMV16/XIO16T, XMVS16/XIO16T, XMC16/XIO16T and CPURx/IOCRx
- Supports VibroSmart® distributed monitoring system (DMS) modules and devices: 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
- Runs on Windows® operating systems: Windows 10, Windows 8.1, Windows Server 2016 and Windows Server 2012



KEY BENEFITS AND FEATURES (continued)

- Proprietary VibroSight databases with optimised data handling for the fastest data retrieval and display
- Tightly-integrated data management



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

In particular, a VibroSight machinery monitoring system solution 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 the measurements and parameters for the machinery being monitored (using VibroSight Configurator), 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).

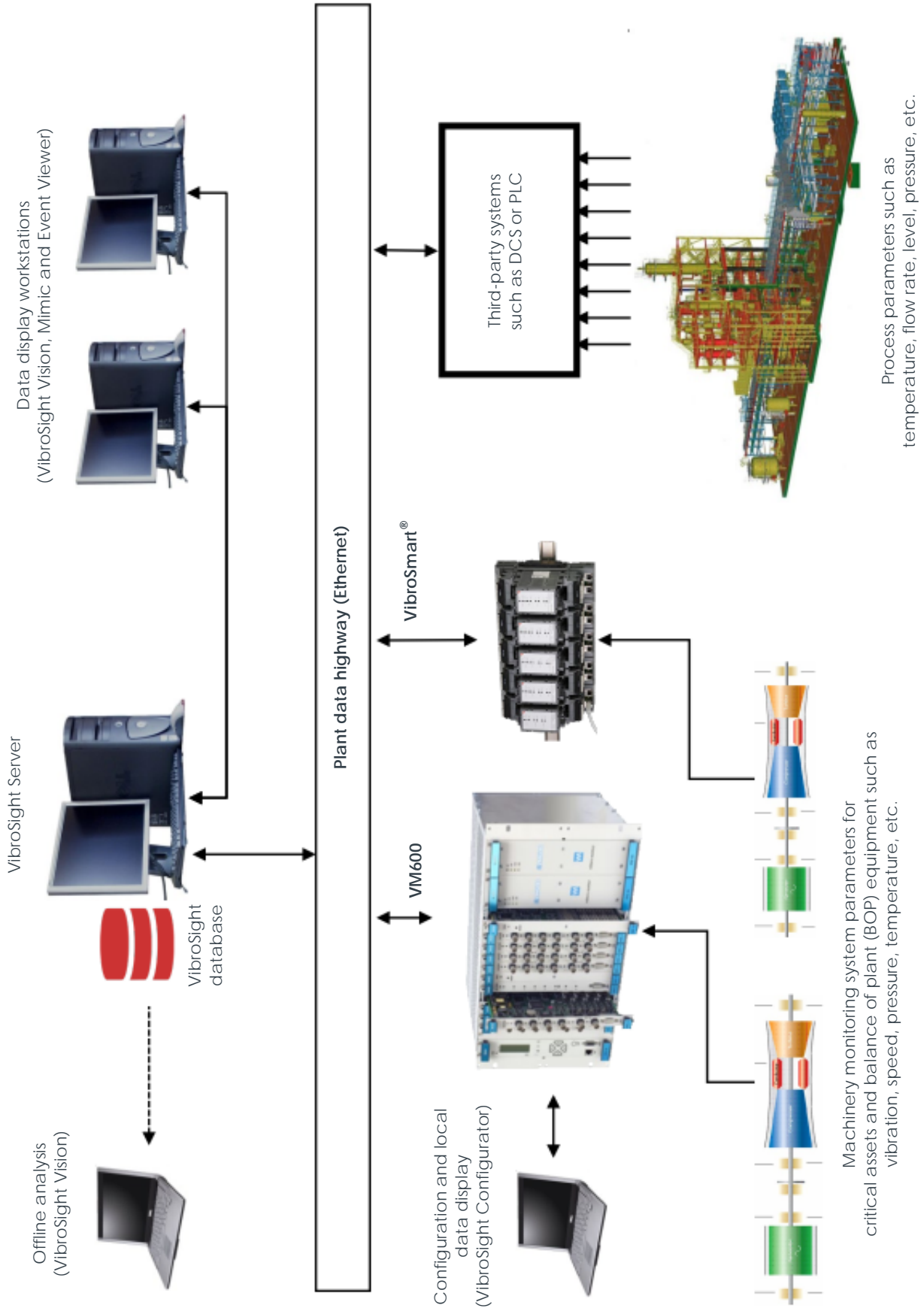
The configuration of parameters depends on the machinery monitoring system hardware used and the particular machinery monitoring application. For example, with VM600 XMx16 card pairs (XMV16/XIO16T, XMVS16/XIO16T and XMC16/XIO16T), data acquisition is continuous, there is extended event and alarm (severity state) handling with multiple alarms per output, and extended processing capabilities.

The principal data acquisition mode for VM600 XMx16 card pairs captures measurement data continuously (typically every 100 ms) and is suitable for normal operation of the machinery being monitored, such as increasing vibration levels and the capture of transients. An auxiliary mode is also available, which is typically used to capture more detailed data at slower update rates. In addition, a VibroSight machinery monitoring system has 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 10, Windows 8.1, Windows Server 2016 and Windows Server 2012 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[®] system solution software is shown overleaf.

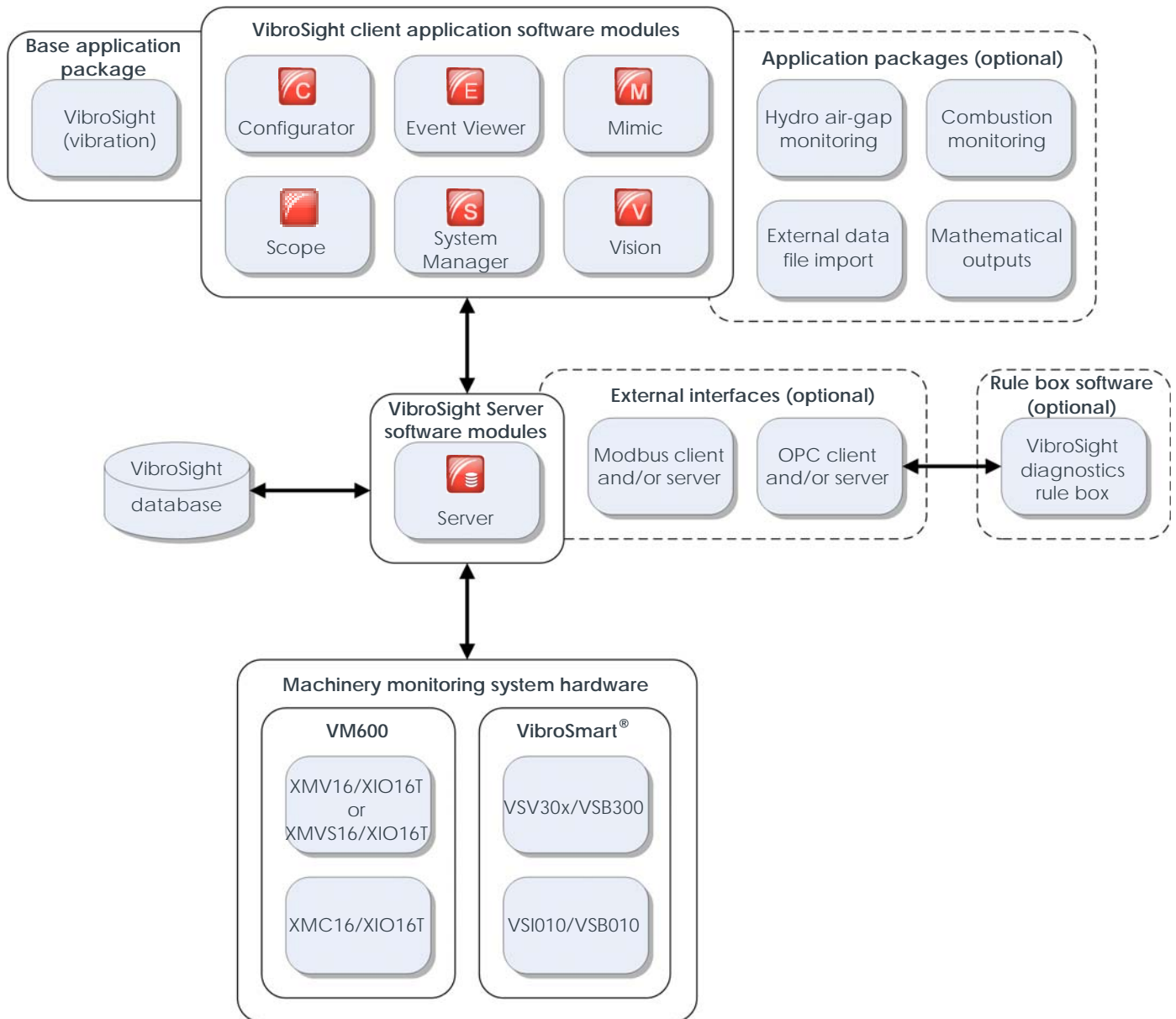
EXAMPLE APPLICATION



DESCRIPTION (continued)

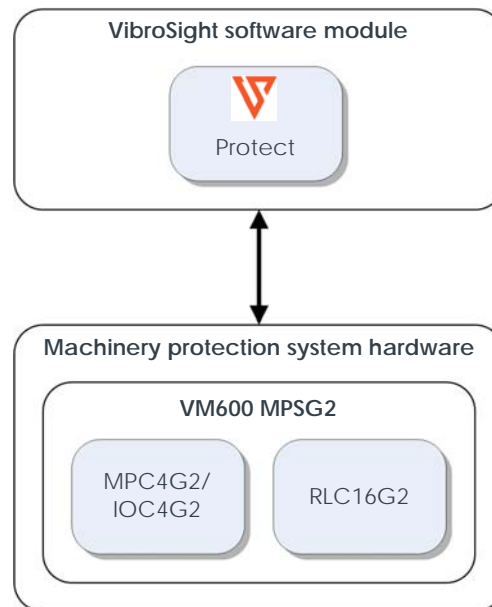
VibroSight software architecture

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 several software modules.



DESCRIPTION *(continued)*

As shown below, the VibroSight[®] software uses a completely separate software module for the configuration and operation of the second generation of VM600 rack-based machinery protection system (MPS) hardware, that is, VM600 MPSG2 systems. This helps ensure complete separation ("segregation") of machinery protection system (MPS) and condition monitoring system (CMS) in a single VM600 rack.



Due to its modular client-server architecture, the VibroSight[®] software can run on a single host computer or be distributed across a number of computers connected to the machinery monitoring system hardware (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, base and application specific packages

VibroSight's software architecture consists of several software modules for use with VM600 cards and/or VibroSmart[®] modules and devices. This flexibility also allows base and application specific packages to be provided for different machinery monitoring applications.

The base/standard VibroSight[®] (that is, the base application package) 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.

DESCRIPTION *(continued)*

If required, the base/standard VibroSight® can be expanded to include one or more of the application specific packages available:

- 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 – for the import of external data into VibroSight Servers (*.vshdf) using CSV and/or VibroSight historical data archive (*.vshda) files.
- Mathematical outputs – to enable math post-processing on the data in VibroSight Servers (*.vshdf) in order to calculate and create new data and 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.

For VM600 systems, data can equally be exported via PROFIBUS if a CPUR2/IOCR2 rack controller and communications interface card pair is also available in the rack.

For VibroSmart® systems, data can equally be exported via Modbus, PROFIBUS and/or the IEC 61850 GOOSE protocol if a VSI010/VSB010 communications interface module is also available in the system.

Hardware compatibility

For VM600 condition monitoring applications, the VibroSight® software is designed to take advantage of the extended processing capabilities and high data throughput of the VM600 XMx16 extended condition monitoring card pairs:

- 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 card pairs, if used.

For VM600 machinery protection applications, the VibroSight® software includes VibroSight Protect, which is designed specifically for operation with the second generation of VM600 rack-based machinery protection system (VM600 MPSG2) cards:

- MPC4G2/IOC4G2 machinery protection card pair
- RLC16G2 relay card.

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 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 are a proprietary database (data repository) system, consisting of VibroSight historical data folders (*.vshdf) for the handling and logging of data by a VibroSight Server, and VibroSight historical data archives (*.vshda) for the 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 (*.vsdha) 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 and VM600 XMV16 cards include 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.
OPC HDA	<p>VibroSight includes support for OPC HDA (historical data access) such 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. 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. Advantages of OPC UA include platform independence, improved security, multiple properties per data item (tag), and easier system configuration and operation. 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	<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. File generation, importation and synchronisation is performed automatically in quasi real-time. 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. 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>

SOFTWARE MODULES

The VibroSight software architecture consists of the following software modules:

 <p>Configurator</p>	<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 (DMSs).</p> <p>More specifically, it is used to configure:</p> <ul style="list-style-type: none"> • VM600 XMx16/XIO16T card pairs (and CPUx/IOCx card pairs). • VibroSmart VSV30x/VSB300 modules, VSI010/VSB010 modules (and VSN010 devices). <p>The configuration 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. VibroSight Configurator is also used to configure other system functionality such as external interfaces using industry standard protocols such as Modbus and OPC to third-party devices.</p>
 <p>Event Viewer</p>	<p>VibroSight Event Viewer is the client application software module that is used to log and view the events stored in VibroSight databases.</p> <p>Such events may have been created automatically by the machinery monitoring system or defined by users. For example, Event Viewer can provide 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>
 <p>Mimic</p>	<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.</p> <p>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>
 <p>Scope</p>	<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).</p> <p>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>
 <p>Server</p>	<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 (*.vshdf) used for data storage.</p> <p>All requests for information from a VibroSight Server (*.vshdf), 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>
 <p>System Manager</p>	<p>VibroSight System Manager is the client application software module that provides the tools to manage the machinery monitoring system hardware.</p> <p>System Manager is used to activate software, upgrade firmware, configure IP addresses and NTP server settings.</p>

SOFTWARE MODULES *(continued)*

 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 XMx16 cards and/or VibroSmart modules and devices, and the measurement data stored in VibroSight databases (*.vshdf and *.vshda) to be displayed.</p> <p>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 13). The plots are fully customisable and navigation tools such as cursors, scaling and zooming facilitate the interpretation of the data.</p>
 Protect	<p>VibroSight Protect is the software module used for the configuration and operation of the second generation of VM600 rack-based machinery protection system (MPS) hardware, that is, VM600 MPSG2 systems.</p> <p>More specifically, it is used to configure:</p> <ul style="list-style-type: none"> • VM600 MPC4G2/IOC4G2 card pairs and RLC16G2 cards. <p>Notes: VibroSight Protect is completely separate and distinct to VibroSight Configurator in order to ensure the complete separation (“segregation”) of machinery protection and condition monitoring in a VM600 rack.</p> <p>For reference, the VM600 MPSx software is used for the configuration and operation of the first generation of VM600 rack-based machinery protection system (MPS) hardware, that is, VM600 MPS systems containing VM600 MPC4/IOC4T card pairs (and AMC8/IOC8T card pairs) and RLC16G2 cards.</p>

BASE AND APPLICATION SPECIFIC PACKAGES

The base VibroSight software includes all of the features required for typical machinery vibration monitoring and analysis:

Base application package	
VibroSight	Provides full support for vibration analysis in order to monitor rotating machinery in a wide range of standard industrial applications.

In addition, optional 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	<p>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 of the air gap to be monitored.</p> <p>Note: The hydro air-gap monitoring package is used with the VM600 XMV16/XIO16T or VibroSmart® VSV30x/VSB300.</p>
Combustion monitoring	<p>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.</p> <p>Note: The Combustion monitoring package is used with the VM600 XMC16/XIO16T.</p>
External data file import	Allows data import into a VibroSight system from CSV and/or VSDHA files.
Mathematical outputs	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.

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 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 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 interfaces 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. VibroSight's OPC UA interfaces 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, OPC HDA versions 1.0, 1.1 and 1.2 and 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 card pair (in spare slots of the VM600 rack) 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 card pair.</p>

EXTERNAL INTERFACES *(continued)*

CSV files	CSV files are comma-separated values file, that is, delimited text files that use commas to separate values. 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. 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.
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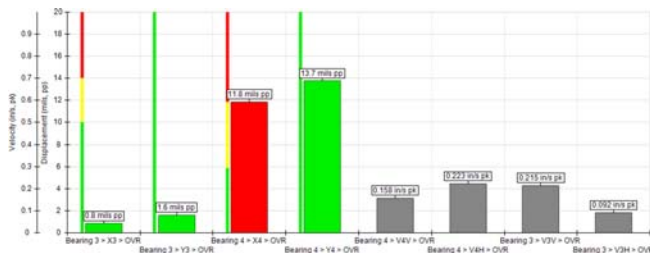
Note: Once imported into VibroSight, data from third-party systems is considered as VibroSight data and is handled and treated in exactly the same way for the purposes of data logging, display and analysis. For example, imported data can be displayed live in VibroSight Vision and/or logged to a VibroSight Server (*.vshdf).

PLOTS

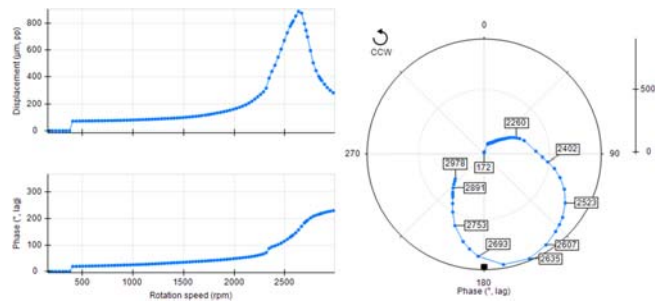
The following types of plot are included as standard in the VibroSight Vision catalogue of plots:

- 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

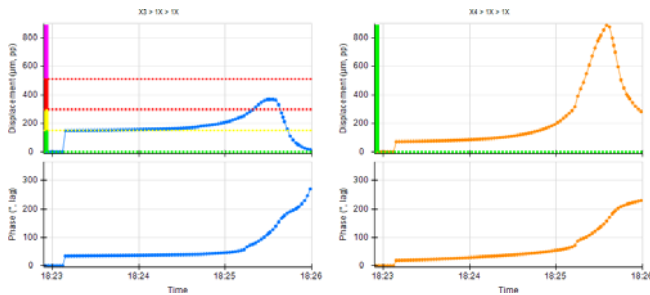
Bar Chart plot



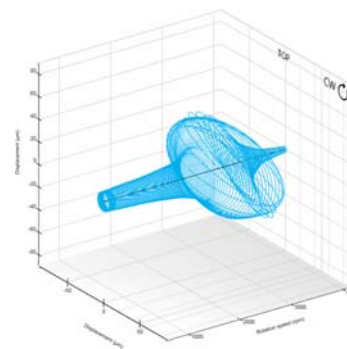
Polar plot



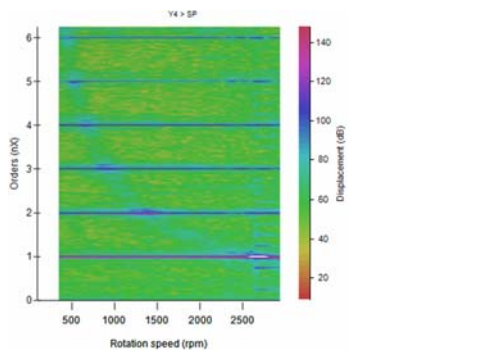
Trend plot



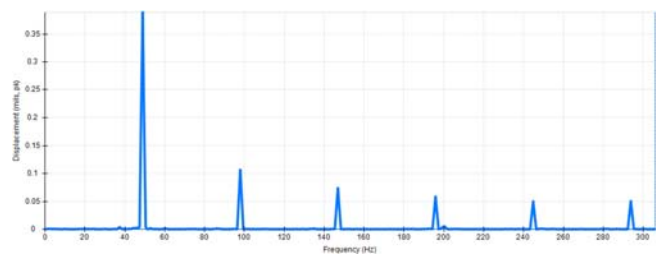
Corbit (cascaded orbit)



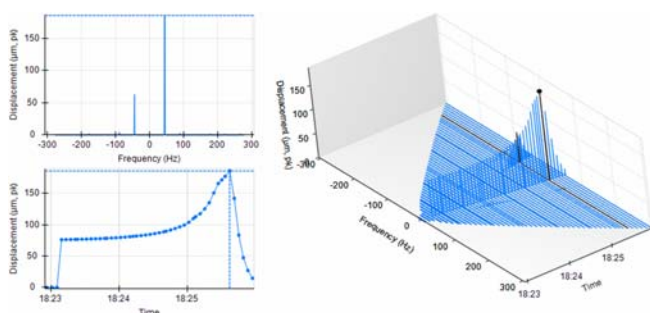
Spectrogram plot



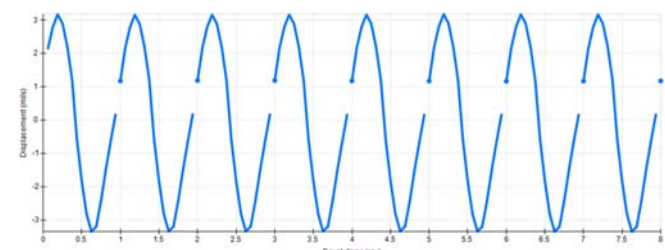
Spectrum plot



Waterfall/Cascade plot



Waveform plot



COMPATIBLE HARDWARE

VM600-rack based systems for condition monitoring:

- XMV16/XIO16T condition monitoring card pair for vibration
- XMVS16/XIO16T condition monitoring card pair for vibration
- XMC16/XIO16T condition monitoring card pair for combustion

Note: VibroSight is also used for the configuration of CPUR/IOCR or CPUR2/IOCR2 rack controller and communications interface card pairs, if used.

VM600-rack based systems for machinery protection (VM600 MPSG2):

- MPC4G2/IOC4G2 machinery protection card pair
- RLC16G2 relay card

Note: The second generation of VM600 rack-based machinery protection system (VM600 MPSG2) hardware will be launched in 2021. The first generation of VM600 MPS hardware (MPC4/IOC4T and RLC16, and AMC8/IOC8T) are compatible with the VM600 MPSx software.

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

COMPUTER SYSTEM REQUIREMENTS

Typical computer configuration for standard machinery monitoring applications:

- 2.0 GHz or faster multi-core 64-bit (x64) processor
- 8 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 and/or Internet access for software installation
- Optional 100 GB (or larger) backup media
- 64-bit Microsoft® Windows operating systems such as Windows 10, Windows 8.1, Windows Server 2016 or Windows Server 2012 with Microsoft .NET Framework 4.7.2 or later

COMPUTER SYSTEM REQUIREMENTS *(continued)*

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
- 16 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 and/or Internet access for software installation
- Optional 250 GB (or larger) backup media
- 64-bit Microsoft® Windows operating systems such as Windows 10, Windows 8.1, Windows Server 2016 or Windows Server 2012 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
- 4 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 and/or Internet access for software installation
- 32-bit Microsoft® Windows operating systems such as Windows 10 or Windows 8.1 with Microsoft .NET Framework 4.7.2 or later

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

PRODUCT SUPPORT AND MAINTENANCE

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.

Product support and maintenance is free for the first year and includes:

- Email and telephone support
- Software updates and upgrades

Notes:

A VibroSight software license includes free software updates and upgrades for the duration of the time period defined by the purchased Updates and support (order option code Dxx) as shown in **Ordering information – VibroSight on page 18**.

Specific application and configuration support as well as upgrade support is excluded but can be provided at an additional charge. Contact your local Meggitt representative for further information.

APPROVALS

Russian federal agency for technical regulation and metrology (Rosstandart):

- Pattern approval certificate CH.C.28.004.A N° 60224

SOFTWARE EDITIONS

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

		VibroSight edition							
		Live	Trend	Standard	Network client	Offline	MPS tools	VibroSmart free	Site xxxx channels
Feature	Handling of static measurement data (variables), alarms (severity states) and events	✓	✓	✓	✓	✓	✓	✓	✓
	Handling of dynamic measurement data	✓		✓	✓	✓		✓	✓
	Live measurement data server VibroSight Server for communication with VM600 XMx16 cards or VibroSmart modules and devices	✓	✓	✓				✓	✓
	Live measurement data display Display of live measurement data from VM600 XMx16 cards or VibroSmart modules and devices	✓	✓	✓	✓		✓	✓	✓
	Historical measurement data logging		✓	✓				✓	✓
	Historical measurement data display		✓	✓	✓	✓		✓	✓
	Mimics	✓	✓	✓	✓			✓	✓
	Bar chart plot and Table plot	✓	✓	✓	✓	✓		✓	✓
	Trend plot	✓	✓	✓	✓	✓		✓	✓
	Other plots Bode, Corbit, Correlation, Orbit, Polar, Polar Waveform, Shaft Centreline, Spectrogram, Spectrum, Spider, Full Spectrum, Waterfall/Cascade, Full Waterfall/Cascade, Waveform and Long Waveform	✓		✓	✓	✓		✓	✓

The **Live** edition is a reduced feature edition capable of handling live data for both static and dynamic measurements. All VibroSight modules (VibroSight Server and the client applications) are included and the complete catalogue of plots is available in VibroSight Vision (see **Plots on page 13**).

The **Trend** edition is a reduced feature edition capable of handling live and historical data for static measurement, alarms and events only. No dynamic measurement data such as waveforms, spectra or orbits are available. A VibroSight Server (*.vshdf) can be used for data logging. All VibroSight modules (VibroSight Server and the client applications) are included, but only Bar Chart, Table and Trend plots are available in VibroSight Vision.

The **Standard** edition is the fully featured edition with full system capabilities. It is capable of handling live and historical data for both static and dynamic measurements. All VibroSight modules (VibroSight Server and the client applications) are included and the complete catalogue of plots is available in VibroSight Vision (see **Plots on page 13**).

The **Network client** edition is an edition intended for use on a network client computer in order to access a remote host computer that is running a VibroSight Server. This allows the data visualisation tasks (VibroSight Vision) to be off-loaded from the server computer and also allows multiple users to connect to a VibroSight Server from several client computers at the same time. This edition is capable of handling live and historical data for both static and dynamic measurements from remote server computers. Only the VibroSight client applications are included and the complete catalogue of plots is available in VibroSight Vision (see **Plots on page 13**).

Note: VibroSight Server is not included in the Network client edition.

The **Offline** edition is an edition intended for use with offline VibroSight databases (*.vshda) in order to visualise and analyse historical data only. This edition is capable of handling historical data for both static and dynamic measurements from local VibroSight databases but it is not possible to connect to a running VibroSight Server. Only VibroSight Server and the VibroSight Event Viewer, System Manager and Vision client applications are included and the complete catalogue of plots is available in VibroSight Vision (see **Plots on page 13**).

Note: The VibroSight Server included in the Offline edition is limited to opening local VibroSight databases.

SOFTWARE EDITIONS *(continued)*

The **MPS Tools** edition is an edition intended for use with VibroSmart[®] systems configured for machinery protection only. This edition is capable of handling live data for static measurements directly from VibroSmart modules and devices but it is not possible to connect to a VibroSight Server. No dynamic measurement data such as waveforms, spectra or orbits are available and no data logging is possible. Only the VibroSight Configurator, VibroSight Protect, VibroSight Scope and VibroSight System Manager client applications are included. Note: VibroSight Server is not included in the MPS Tools edition.

The MPS tools edition replaces the previously available VibroSmart Tools edition.

The **VibroSmart free** edition is an edition intended for use with VibroSmart[®] systems with up to 4 × dynamic channels (that is, up to 2 × VSV30x/VSB300 modules). This edition is capable of handling live and historical data for both static and dynamic measurements. All VibroSight modules (VibroSight Server and the client applications) are included and the complete catalogue of plots is available in VibroSight Vision.

The **Site xxxx channels** editions are intended for use with VM600 and/or VibroSmart[®] systems on sites with channel counts up to known specific limits of **128, 256, 512, 1024** or **1536** × dynamic channels.

ORDERING INFORMATION – VIBROSIGHT

To order the VibroSight® software please specify:

Type	Designation	Ordering number (PNR)
VibroSight software	Machinery monitoring software CD Software for the configuration, operation and management of machinery monitoring systems (VM600 systems and/or VibroSmart distributed monitoring systems).	609-004-000-SSS/Codes

Notes

“SSS” represents the software version, for example, 609-004-000-040 corresponds to VibroSight 4.0.

Use the order option codes below to specify order options in the format 609-004-000-SSS/Axx-Bxx-Cxx-Dxx-Exx-AAxxx-ABxxx-ACxxx-BAxx-BBxx-BCxx-BDxx. For example, a complete ordering number is 609-004-000-xxx/A01-B01-C03-D01-E00-AA032.

Order option codes:

Code	Feature	Value	Description
A	Order type (see note 2 on page 20)	01	New installation, requiring a VibroSight software version (via CD or FTP) and a new license key
		02	Major or minor level (x.x.x) software upgrade, requiring a later VibroSight software version (via CD or FTP) and a new license key
		03	Expansion to support additional channels or tags using the existing VibroSight software version, requiring a new license key
		04	Demo
B	Language	01	English
C	Software edition (see Software editions on page 16 and note 3 on page 21)	01	Live
		02	Trend
		03	Standard (server computer installation)
		04	Network client (client computer installation)
		05	Offline
		06	MPS tools Software edition for machinery protection systems only, that is, it is not possible to connect to a VibroSight Server.
		07	VibroSmart free Software edition for VibroSmart systems supporting up to 4 dynamic measurement channels, that is, up to two VSV30x modules.
		08	Site 128 channels Software edition for systems supporting up to 128 dynamic measurement channels (VM600 XMx16 and/or VibroSmart VSV30x).

ORDERING INFORMATION – VIBROSIGHT (continued)

Code	Feature	Value	Description
C	Software edition (see Software editions on page 16 and note 3 on page 21)	09	Site 256 channels Software edition for systems supporting up to 256 dynamic measurement channels (VM600 XMx16 and/or VibroSmart VSV30x).
		10	Site 512 channels Software edition for systems supporting up to 512 dynamic measurement channels (VM600 XMx16 and/or VibroSmart VSV30x).
		11	Site 1024 channels Software edition for systems supporting up to 1024 dynamic measurement channels (VM600 XMx16 and/or VibroSmart VSV30x).
		12	Site 1536 channels Software edition for systems supporting up to 1536 dynamic measurement channels (VM600 XMx16 and/or VibroSmart VSV30x).
D	Updates and support (see note 4 on page 21)	01	1 year
		02	2 years
		03	3 years
		05	5 years
		10	10 years
E	Optional packages (see note 5 on page 21)	00	None
		01	Hydro air-gap monitoring
		02	Combustion monitoring
		03	External data file import
		04	Mathematical outputs
AA	Number of XMV16 and/or XMVS16 channels (see note 6 on page 21)	000	None
		004	4 channels
		008	8 channels
		016	16 channels
		032	32 channels
		064	64 channels
		128	128 channels
		256	256 channels
AB	Number of XMC16 channels (see note 6 on page 21)	000	None
		016	16 channels
		032	32 channels
		048	48 channels
		064	64 channels

ORDERING INFORMATION – VIBROSIGHT (continued)

Code	Feature	Value	Description
AC	Number of VSV30x channels	000	None
		002	2 channels
		004	4 channels
		008	8 channels
		016	16 channels
		032	32 channels
		064	64 channels
		128	128 channels
		256	256 channels
BA	Number of Modbus server tags	00	None
		99	Unlimited
BB	Number of OPC server tags	00	None
		99	Unlimited
BC	Number of Modbus client tags	00	None
		01	100 tags
		05	500 tags
		10	1000 tags
		25	2500 tags
		50	5000 tags
		99	Unlimited
BD	Number of OPC client tags	00	None
		01	100 tags
		05	500 tags
		10	1000 tags
		25	2500 tags
		50	5000 tags
		99	Unlimited

Notes

1. **Bold text** in the above table indicates default order option code values.

2. Order type (Axx)

The different order types are typically used as follows:

- Order type A01 is for a new VibroSight installation.
- Order type A02 is for an existing VibroSight installation that requires a major or minor level (x.x.x) upgrade to a later version of the VibroSight software. the ability to install and run VibroSight software updates and upgrades depends on the purchased Updates and support (Dxx) package. In general, a new license key file is required for upgrades between major and minor version releases (x.x.x) and the license key file remains unchanged between update level releases (x.x.x).

Order type A03 is for an existing VibroSight installation that requires an expansion of the currently installed version of the VibroSight software to support an additional number of channels (XMx16 or VSV30x) and/or tags (Modbus and/or OPC).

ORDERING INFORMATION – VIBROSIGHT *(continued)*

Notes (continued)

3. Software edition (Cxx)

The MPS tools software edition (order option code C06) replaces the previously available VibroSmart tools software edition (also order option code C06) which has been discontinued since VibroSight 4.0.

For the Site xxx/xxxx channels software editions (order option codes C08 to C12):

- The number of licensed dynamic measurement channels can be shared between multiple different VM600 XMx16 cards and/or VibroSmart VSV30x modules and/or multiple different VibroSight Servers as required.
- It is not required to use Number of XMV16 and/or XMVS16 channels (order option code AAxxx), Number of XMC16 channels (order option code ABxxx) and/or Number of VSV30x channels (order option code ACxxx) to specify the number of dynamic measurement channels.

4. Updates and support (Dxx)

Since VibroSight 4.0, VibroSight uses a perpetual (permanent) license scheme such that there is no expiration date for a license and therefore the software can be used indefinitely. Accordingly, a license now includes free software updates and upgrades for the duration of the time period defined by the purchased Updates and support.

For example, if a VibroSight software license is purchased with the default Updates and support period of 1 year (order option code D01), then all VibroSight software updates and upgrades are free for 1 year following the date when the VibroSight software license is generated.

Technical support is provided for the duration of the licensed Updates and support period (order option code Dxx) for issues that are demonstrable in the currently supported release(s) of VibroSight in an application that meets the published system requirements. Specific application and configuration support as well as upgrade support is excluded but can be provided at an additional charge. Contact your local Meggitt representative for further information.

After the purchased Updates and support period expires, VibroSight software updates, upgrades and technical support are no longer free and must be purchased by ordering a complete new VibroSight software license or by ordering additional years of Updates and support to extend the coverage of an existing license. In order to extend the Updates and support coverage of an existing VibroSight software license, all previous years counting from the expiration date of the last licensed Updates and support period must be paid.

5. Optional packages (Exx)

The optional External data file import package (order option code E03) supports data import into VibroSight from CSV and/or VSDHA files.

6. Number of XMx16 channels (AAxxx and ABxxx)

The highly configurable nature of VibroSight and the machinery monitoring system hardware (VM600 cards and/or VibroSmart modules and devices), and the wide variation in machinery monitoring applications makes it impossible to define operating limits for VibroSight that are correct under all circumstances. However, as general guidelines, Meggitt Energy & Equipment recommends the following:

- Up to 11 × VM600 XMx16 card pairs per instance of a VibroSight Server in typical vibration monitoring applications using both static and dynamic measurement data.
- Up to 32 × VM600 XMx16 card pairs per instance of a VibroSight Server in applications using static measurement data only.

For applications that exceed these recommendations, please contact your local Meggitt representative to discuss a suitable VibroSight system architecture.

Refer also to VibroSight application note 006 *VM600 cards per VibroSight Server: recommendations for vibration monitoring applications* for more information.

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)

	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
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

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