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VibroSight® software version 7.1

VibroSight
Machinery Protection &
Condition Monitoring
Software

REVISION RECORD SHEET

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PREFACE

About these release notes

This document provides important information about the VibroSight® software from Meggitt SA. It is applicable to all VibroSight-based condition monitoring systems using the versions of software described by this document, namely:

- VibroSight software version 7.1.0
  (part numbers (PNRs) software license: 608-001-000-001/Codes
  and software: 609-010-000-001 on physical media (USB device (flash drive/key))).

This document contains information about changes to the software since the previously released version (VibroSight 6.1.x), such as new features and improvements, solved problems and bug fixes, and hardware and software compatibility.

For more general information on the actual software, or the entire machinery protection system (MPS) and/or condition monitoring system (CMS), refer to the following Meggitt SA documentation:

VibroSight® software data sheet
(document reference 660-020-005-225A)

Getting started with VibroSight® installation guide
(document reference 660-010-006-231A)

VibroSight® help

VM600Mk2 MPC4Mk2 + IOC4Mk2 machinery protection and condition monitoring module data sheet
(document reference 268-121)

VM600Mk2 RLC16Mk2 relay module data sheet
(document reference 268-125)

VM600Mk2 CPUMMk2 + IOCNMk2 rack controller and communications interface module data sheet
(document reference 268-135)

VM600Mk2/VM600 XMx16 + XIO16T extended condition monitoring modules data sheet
(document reference 660-020-010-211A)

VibroSight application notes and technical notes.

Users who are familiar with VibroSight may also find it useful to refer to the release notes included in earlier versions of the software:

- VibroSight 7.0.0 (document reference 660-010-013-233A)

- VibroSight 6.1.0 (document reference 660-010-013-232A)

- VibroSight 6.0.0 (document reference 660-010-013-231A)

- VibroSight 5.1.0 (document reference 660-010-013-230A)

- VibroSight 5.0.0 (document reference 660-010-013-229A)

- VibroSight 4.1.0 (document reference 660-010-013-228A)

- VibroSight 4.0.0 (document reference 660-010-013-227A)

- VibroSight 3.8.0 (document reference 660-010-013-226A)

- VibroSight 3.7.0 (document reference 660-010-013-225A)

- VibroSight 3.6.0 (document reference 660-010-013-224A)

- VibroSight 3.5.0 (document reference 660-010-013-223A)

- VibroSight 3.4.0 (document reference 660-010-013-222A)

- VibroSight 3.3.0 (document reference 660-010-013-221A)

- VibroSight 3.2.0 (document reference 660-010-013-220A)

- VibroSight 3.1.0 (document reference 660-010-013-219A)

- VibroSight 3.0.0 (document reference 660-010-013-218A)

- VibroSight 2.12.7 (document reference 660-010-013-217A)

- VibroSight 2.12.6 (document reference 660-010-013-216A)

- VibroSight 2.12.5 (document reference 660-010-013-215A)

- VibroSight 2.12.4 (document reference 660-010-013-214A)

- VibroSight 2.12.3 (document reference 660-010-013-213A)

- VibroSight 2.12.2 (document reference 660-010-013-212A)

- VibroSight 2.12.1 (document reference 660-010-013-211A)

- VibroSight 2.12.0 (document reference 660-010-013-210A)

- VibroSight 2.11.6 (document reference 660-010-013-209A)

- VibroSight 2.11.5 (document reference 660-010-013-208A)

- VibroSight 2.11.4 (document reference 660-010-013-207A)

- VibroSight 2.11.3 (document reference 660-010-013-206A)

- VibroSight 2.11.2 (document reference 660-010-013-205A)

- VibroSight 2.11.1 (document reference 660-010-013-204A)

- VibroSight 2.11.0 (document reference 660-010-013-203A)

- VibroSight 2.10.1 (document reference 660-010-013-201A)

- VibroSight 2.10.0 (document reference VIBROSIGHT-RN/E)

- VibroSight 2.9.7 (document reference VIBROSIGHT-RN/E)

- VibroSight 2.9.6 (document reference VIBROSIGHT-RN/E)

- VibroSight 2.9.5 (document reference VIBROSIGHT-RN/E)

- VibroSight 2.9.4 (document reference VIBROSIGHT-RN/E)

- VibroSight 2.9.2 (document reference VIBROSIGHT-RN/E)

- VibroSight 2.9.1 (document reference VIBROSIGHT-RN/E).

Use of the release notes

You should read those sections that are most relevant to you and then keep the document for future reference.

Version identifiers

A complete VibroSight software version number has four components that provide the following information:

- **x**.x.x.x, major release identifier – typically incremented once per year.

- x.**x**.x.x, minor release identifier – incremented for each release with typically four scheduled releases per year.

- x.x.**x**.x, "hotfix" release identifier – 0 for a normally scheduled release and incremented for each hotfix release.

- x.x.x.**x**, software build number – for internal use.

For each scheduled release of VibroSight, at least one of the first two digits changes (**x.x**.x.x).
For unscheduled "hotfix" releases, which are occasionally required to solve urgent problems, the third digit changes (x.x.**x**.x).

The version identifiers for installed software appear in the Help About box (obtained using **Help > About …** in any VibroSight software module).

Terminology

To distinguish between the different Meggitt SA products that can be used with the VibroSight® software, the following terminology is used in this document:

- VM600^{Mk2}/VM600 modules/card(s) – to refer to VibroSight compatible cards that are installed in a VM600^{Mk2}/VM600 rack (that is, the first generation of VM600 systems).

  The currently available VM600^{Mk2}/VM600 modules/cards that are designed for operation with the VibroSight software are the XMx16 card pairs (XMC16 / XIO16T, XMV16 / XIO16T and XMVS16 / XIO16T) and the CPUx card pairs (CPUR2/IOCR2 and CPUR/IOCR).

  Note: It is important to note that VibroSight Configurator is still used for the configuration of these VM600^{Mk2}/VM600 modules/cards/systems.

  Where XMx16 is used in this document, it refers to XMC16 / XIO16T, XMV16 / XIO16T and XMVS16 / XIO16T cards, unless otherwise stated.

  Where CPUx is used in this document, it refers to CPUR2/IOCR2 and CPUR/IOCR cards, unless otherwise stated.

- VM600^{Mk2} module(s) – to refer to VibroSight compatible modules that are installed in a VM600^{Mk2} rack (that is, the second generation of VM600 systems).

  The currently available VM600^{Mk2} modules that are designed for operation with the VibroSight software are the MPC4^{Mk2} + IOC4^{Mk2} machinery protection and condition monitoring module, the RLC16^{Mk2} relay module and the CPUM^{Mk2} + IOCN^{Mk2} rack controller and communications interface module.

  Note: It is important to note that VibroSight Protect is used for the configuration of VM600^{Mk2} modules/systems.

- VibroSmart® module(s) or VibroSmart® device(s) – to refer to VibroSight compatible VibroSmart modules or devices that are used in a VibroSmart distributed monitoring system. The currently available VibroSmart modules and devices that are designed for operation with the VibroSight software are the VSI010, VSN010 and VSV30x.

  Where VibroSmart module is used in this document, it refers to the VSI010 and VSV30x modules, unless otherwise stated.

  Where VibroSmart device is used in this document, it can refer to the VSN010 device only, or to the VSI010 and VSV30x modules and the VSN010 device, unless otherwise stated.

  Where VSV30x is used in this document, it refers to VSV301 and VSV300 modules, unless otherwise stated.

1 Licensing

Since VibroSight 4.0.0, the ability to install and run VibroSight software updates and upgrades depends on the purchased "Updates and support" package.

NOTE:	VibroSight 7.1.0 is a minor level release and a new license key file is not required for updates and upgrades from VibroSight 7.x.x.
	However, a new license key file is required for updates and upgrades from VibroSight 3.8.x or earlier.

For further information on licensing or to obtain a new VibroSight license key file, contact Meggitt SA customer support. See 7 Customer support.

2 Features

General

2.1 VM600^{Mk2} MPC4^{Mk2} support for hydro air-gap monitoring and analysis

VibroSight 7.1.0 adds support for hydro air-gap monitoring and analysis using data from VM600^{Mk2} MPC4^{Mk2} + IOC4^{Mk2} machinery protection and condition monitoring modules – equivalent to the existing support for this hydro application processing using data from VM600^{Mk2}/VM600 XMV16 modules and/or VibroSmart VSV30x modules.

NOTE:	The VibroSight "Hydro air-gap monitoring" package allows the air gap between rotor and stator, and the rotor and stator shapes (geometrical data) to be monitored for hydroelectric generators. It also allows the magnetic flux (magnetic flux density, also known as magnetic field strength) of the air gap to be monitored.
	The VM600^{Mk2} MPC4^{Mk2} + IOC4^{Mk2} machinery protection and condition monitoring modules now supports hydro air-gap monitoring and analysis only. Additional support for magnetic-flux monitoring and analysis will be added in a future release.

It is important to note that the base/standard edition of the VibroSight software (that is, VibroSight Classic) includes the Hydro air-gap monitoring package in addition to providing 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.

More specifically, VibroSight Protect now allows VM600^{Mk2} MPC4^{Mk2} dynamic channels (CH1-CH4) to be configured for use with air-gap sensors and air-gap processing functions.

When configuring a dynamic channel for use with air-gap sensors, such as LS12x and ILS73x air-gap measurement systems, select Processing type: Single, Sensor family: Airgap sensors, then Air gap.

Then, when prompted to configure the sensor / measurement chain (Configuration of a channel), from the Library, select a LS12x sensor and ILS73x signal conditioner from the list in order to use a sensor / measurement chain with default values. Alternatively, under the Library list, use the Add control to add a new sensor chain (vibro-meter or generic) to the list, or use the Duplicate and/or Edit controls to modify an existing sensor / measurement chain, as required.

(VibroSight Protect configures MPC4^{Mk2} module air-gap sensor / measurement chains to use AC + DC signal coupling with the analogue high-pass filter disabled.)

NOTE:	A LS12x and ILS73x air-gap measurement system provides three output signals: POLE PROFILE, ROTOR PROFILE and MIN GAP.
	It is important to note that the POLE PROFILE output signal must be used as the input to a VM600^{Mk2} MPC4^{Mk2} + IOC4^{Mk2} module for applications that require both machinery protection and condition monitoring functionality.
	For reference, first-generation VM600 (VM600^{Mk1}) MPC4 + IOC4T cards supported the MIN GAP output signal only and provided machinery protection only. That is, the POLE PROFILE (effectively, a "raw" signal) is required for condition monitoring, while the MIN GAP is suitable for machinery protection only.

2.2 VM600^{Mk2} MPC4^{Mk2} support for shaft absolute vibration processing

VibroSight 7.1.0 adds improved support for shaft absolute vibration (SAV) processing and measurements, more specifically X-Y bearing absolute vibration, using the VM600^{Mk2} MPC4^{Mk2} + IOC4^{Mk2} module's dynamic channels.

NOTE:	VibroSight / VM600^{Mk2} MPC4^{Mk2} "X-Y bearing absolute vibration" processing and "X-Y shaft relative vibration" processing are similar types of dual-channel processing that provide similar outputs:
	• X-Y bearing absolute vibration processing requires two velocity sensor based sensors / measurement chains and provides a Vmax vibration measurement output (in terms of velocity, such as mm/s).
	• X-Y shaft relative vibration processing requires two proximity sensor based sensors / measurement chains and provides a Smax vibration measurement output (in terms of displacement, such as μm).

More specifically, VibroSight Protect now allows VM600^{Mk2} MPC4^{Mk2} dynamic channels to be configured for dual-channel X-Y bearing absolute vibration processing functions using velocity sensors (moving-coil or piezoelectric) on CH1-CH2 and/or CH3-CH4.

When configuring the dynamic channels for use with velocity sensors (moving-coil or piezoelectric), select Processing type: Dual, Sensor family: Velocity sensors or velocimeters, then X-Y bearing absolute vibration.

Then, when prompted to configure the sensors / measurement chains (Configuration of a channel), use the Add control to select the velocity sensors or velocimeters from the Library in order to use a sensor / measurement chain with default values. Alternatively, under the Library list, use the Add control to add a new sensor chain (vibro-meter or generic) to the list, or use the Duplicate and/or Edit controls to modify an existing sensor / measurement chain as required.

In VibroSight Protect, when configuring X-Y bearing absolute vibration for machinery protection, it is important to note that:

- The X-Y velocity sensors must have mounting orientations (radial positions) that are at least 30° apart. VibroSight Protect will use a default value of 90°.

- Both X-Y velocity sensors must have the same filter settings (Frequency Span and Filter type).

- The default calculation method for Vmax uses the real maximum displacement value directly from the orbit, that is, the largest radius from the unfiltered orbit. This is a peak measurement.
  Alternatively, Vmax can be calculated using an X-Y max discriminator that uses the maximum value of the peak-to-peak displacement values measured in two orthogonal directions of the unfiltered orbit. This is a peak-peak measurement.

In VibroSight Capture, when configuring X-Y bearing absolute vibration for condition monitoring on the Configure tab/page, it is important to note that:

- For the component/processing selected in the Machinery image (top), the name and type of measurement is displayed (bottom, left), while more detailed information for the associated processing and measurements is displayed (bottom, centre) across three tabs: General, Processing and Alarms.

- The information displayed is a combination of:

  - The information imported from the associated machinery protection system (MPS) configuration, that is, the measurements (sensors / measurements chains, processing and alarms) imported from the VibroSight Protect configuration.

  - The default condition monitoring measurements (processing and alarms) that are automatically generated by VibroSight Capture, depending on the VibroSight Protect configuration.

  - For X-Y bearing absolute vibration for condition monitoring, Orbits (OVR orbit, 1X orbit, 2X orbit) and a Full spectrum with default measurements (1X, 2X, 3X, Not 1X) are configured by default.

NOTE: For the orbits, in addition to the unfiltered overall orbit (OVR orbit), a maximum of 6 filtered orbits are permitted (1n orbit).

For the Full spectrum, the window type is Hanning and the spectrum resolution is 1600 lines (both fixed), while averaging is configurable. In addition, a maximum of 6 highly-configurable frequency domain extractions/measurements are permitted.

In general, on the Processing tab, under Condition monitoring, the default setttings can be changed as required. On the Alarms tab, under Condition monitoring, alarms can also be added as required.

NOTE:	It is important to note that in VibroSight Capture, any machinery protection system (MPS) information is displayed for information only and cannot be edited. In general, such information is displayed as being unavailable (that is, greyed out).
	However, all condition monitoring system (CMS) information can be freely edited in VibroSight Capture, as required by the user.

2.3 VM600^{Mk2} MPC4^{Mk2} support for custom processing

VibroSight 7.1.0 adds support for custom processing and measurements, more specifically, Custom dynamic and/or Custom quasi-static using the VM600^{Mk2} MPC4^{Mk2} + IOC4^{Mk2} module's dynamic channels, and Custom quasi-static processing using the VM600^{Mk2} MPC4^{Mk2} + IOC4^{Mk2} module's auxiliary channels

NOTE:	VibroSight / VM600^{Mk2} MPC4^{Mk2} Custom dynamic processing and Custom quasi-static processing functions can be used by sensors / measurement chains created in the Other sensors category/section of the sensor catalogue. See also 2.9 Sensor catalog changes.

More specifically, VibroSight Protect now allows VM600^{Mk2} MPC4^{Mk2} dynamic channels to be configured for Custom dynamic processing and/or Custom quasi-static processing functions using custom/other sensors on CH1-CH4. It also allows VM600^{Mk2} MPC4^{Mk2} auxiliary channels to be configured for Custom quasi-static processing functions using custom/other sensors on AX1-AX2.

When configuring dynamic or auxiliary channels for use with custom/other sensors, select Processing type: Single, Sensor family: Other sensors, then Custom dynamic or Custom quasi-static, as appropriate.

Then, when prompted to configure the sensor / measurement chain (Configuration of a channel), from the Library, select the sensor / measurement chain from the list in order to use a previously created custom/other sensor with default values. Alternatively, under the Library list, use the Add control to add a new generic sensor chain to the list, or use the Duplicate and/or Edit controls to modify an existing sensor / measurement chain as required.

In VibroSight Protect, when configuring Custom dynamic processing for machinery protection, it is important to note that:

- A dynamic (AC) type custom/other sensor is required.

- A dynamic (CH1-CH4) or auxiliary (AX1-AX2) channel can be used.

- Fixed frequency or Order tracking data acquisition can be selected, and most parameters (Frequency span, Window type, etc.) can be freely configured.

- A single "overall" measurement is available by default. Additional frequency domain and/or time domain measurements and alarms can be added.

In VibroSight Protect, when configuring Custom quasi-static processing for machinery protection, it is important to note that:

- A quasi-static (DC) type custom/other sensor is required.

- An auxiliary (AX1-AX2) channel can be used.

- Only a single quasi-static "overall" measurement (and alarm) is available.

In VibroSight Capture, when configuring Custom dynamic processing for condition monitoring, it is important to note that:

- For the component/processing selected in the Machinery image (top), the name and type of measurement is displayed (bottom, left), while more detailed information for the associated processing and measurements is displayed (bottom, centre) across three tabs: General, Processing and Alarms.

- The information displayed is a combination of:

  - The information imported from the associated machinery protection system (MPS) configuration, that is, the measurements (sensors / measurements chains, processing and alarms) imported from the VibroSight Protect configuration.

  - The default condition monitoring measurements (processing and alarms) that are automatically generated by VibroSight Capture, depending on the VibroSight Protect configuration.

  - For Custom dynamic processing for condition monitoring, no waveform or spectrum measurements are configured by default.

In general, on the Processing tab, under Condition monitoring, the default setttings can be changed as required. On the Alarms tab, under Condition monitoring, alarms can also be added as required.

| NOTE: | It is important to note that in VibroSight Capture, any machinery protection system (MPS) information is displayed for information only and cannot be edited. In general, such information is displayed as being unavailable (that is, greyed out). |
| | However, all condition monitoring system (CMS) information can be freely edited in VibroSight Capture, as required by the user. |

2.4 VM600^{Mk2} systems, VibroSight Capture and VSHDA data source import

For Vibrosight VM600^{Mk2} systems, VibroSight Capture is used to configure the system interfaces associated with a VibroSight database/system, such as:

- A VibroSight Protect configuration – used as the basis for a VibroSight Capture configuration.

NOTE:	It is important to note that when using VibroSight Capture to configure a VM600^{Mk2} system for condition monitoring, the condition monitoring (CMS) configuration builds on the existing machinery protection (MPS) configuration, as defined using VibroSight Protect.

And now …

- VSHDA data source (VibroSight historical data archive (*.vshda) files) – used for external data file import (database mirroring).

NOTE:	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 all performed automatically in quasi real-time. While primarily intended for remote monitoring and diagnostics applications working with monitoring systems installed in cyber-secure environments (behind a 'data diode' or firewall), this feature is also useful for remote sites that have unreliable network connections.

In VibroSight Capture, to use a VSHDA data source to import data into a VibroSight database/system:

- Use the Systems tab/page to add the VSHDA data source interface.

  In the main window (centre), click on the "+" (add a system) box to display the new system window, then select a VSHDA data source to add the interface device, as required.
  The VSHDA data source icon is added to the Systems tab/page.

- On the Systems tab/page, configure the VSHDA data source interface.

  In the main window (centre), click on the VSHDA data source icon to select it.
  The VSHDA data source parameters are displayed in the main window (centre) and can be edited as required.

  Note: At any time, clicking on Return to systems (main window, centre, top right) will return to the main (home) view of the Systems tab/page.

  Configuring a VSHDA data source requires that the following parameters are configured:

  • Enabled, Name, Description, Input directory, Remove VSHDA files after processing, Remove invalid VSHDA files.

Where:

Enabled: An external VSHDA data source is Enabled by default but can be Disabled, as required.

Name: Use the default name for the external VSHDA data source or change it, as required.

Description: Optional text to help describe the configuration/application.

Input directory: The location of the folder containing the VibroSight historical data archive (*.vshda) files from a remote site, that is, the external VSHDA data files.

NOTE: This can be a folder on the computer running the central VibroSight Server or a network directory/folder.

Remove VSHDA files after processing: When this check box is selected, the central VibroSight Server will automatically delete a VibroSight historical data archive (*.vshda) file from the input folder after it has finished with it.

NOTE: It can be useful to see the VibroSight historical data archive (*.vshda) files in the input folder when initially configuring and working with a central VibroSight Server. But once the system is working as expected, it is recommended to select this check box to automatically delete them in order to reduce storage requirements (avoiding potential issues such as a disk-full situation).

Remove invalid VSHDA files: When this check box is selected, the central VibroSight Server will automatically delete from the input folder any VibroSight historical data archive (*.vshda) files that do not match the remote VibroSight Server's unique 'configuration identifier (GUID)' or any data archive files that are corrupted.

NOTE: A central VibroSight Server automatically extracts and uses the remote VibroSight Server's 'configuration identifier (GUID)' from the first VibroSight historical data archive (*.vshda) file copied to its Input directory folder.

Using a VSHDA data source to import data into a central VibroSight database/system requires that the remote VibroSight Server is configured to generate VibroSight historical data archive (*.vshda) files at a data rate that is suitable for the application. The data update rate required for the remote monitoring and diagnostics of live data is usually of the order of minutes.

A third-party tool is then used to copy the VibroSight historical data archive (*.vshda) files from a remote site (higher-security level) – via a secure data diode – to a central diagnostics centre (lower-security level).

> **NOTE:** Since data diodes are unidirectional, it is not possible to use them to gain access to and interfere in the operation of the machinery being monitored.

In the diagnostics centre, a central VibroSight Server acts as replica/mirror data repository for the remote site. That is, the central VibroSight Server automatically accesses and collates the data from the VibroSight historical data archive (*.vshda) files copied from a remote site. In this way, a local data repository (VibroSight historical data folder (*.vshdf) file) is created that is suitable for remote monitoring and diagnostics.

When working with VSHDA data source configurations, the Consistency checks window (bottom) can be used to run and/or display consistency check information so that any problems in the VM600^{Mk2} system configuration can be corrected.

Also, the VibroSight Capture configuration is saved and activated in the usual way, that is, using the File > Save as server and/or the File > Apply changes to active configuration menu commands, as appropriate.

Finally, once the VibroSight Server is up and running, the Server feature required by the VSHDA data source (VSHDA import) must be enabled via the server's user interface, as appropriate.

2.5 VM600^{Mk2} systems, VibroSight Capture and OPC and OPC UA clients

For Vibrosight VM600^{Mk2} systems, VibroSight Capture is used to configure the system interfaces associated with a VibroSight database/system, such as:

- A VibroSight Protect configuration – used as the basis for a VibroSight Capture configuration.

NOTE:	It is important to note that when using VibroSight Capture to configure a VM600^{Mk2} system for condition monitoring, the condition monitoring (CMS) configuration builds on the existing machinery protection (MPS) configuration, as defined using VibroSight Protect.

And now …

- OPC devices and OPC UA devices – used for the import of external data via OPC into a VibroSight database, for example, from third-party systems such as a DCS or PLC.

In VibroSight Capture, to use an OPC device or OPC UA device to import data into a VibroSight database/system:

- Use the Systems tab/page to add the OPC or OPC UA interface, depending on the application.

  In the main window (centre), click on the "+" (add a system) box to display the new system window, then select an OPC device or an OPC UA device to add the interface, as required.
  The OPC device or OPC UA device icon is added to the Systems tab/page.

- On the Systems tab/page, configure the OPC and/or OPC UA device interface.

  In the main window (centre), click on the OPC device or OPC UA device icon to select it.
  The OPC device or OPC UA device parameters are displayed in the main window (centre) and can be edited as required.

  Note: At any time, clicking on Return to systems (main window, centre, top right) will return to the main (home) view of the Systems tab/page.

  For example, configuring an OPC device requires that the following parameters are configured:

  • Enabled, Name, Description, Host name or address, Authentication settings (with Test), OPC server name (with browse), Authentication settings (with Test).

  For example, configuring an OPC UA device requires that the following parameters are configured:

  • Enabled, Name, Description, OPC UA server URL (with Browse), Security policy, Message security mode, Authentication settings.

- On the Systems tab/page, configure the OPC and/or OPC UA device tag groups.

  In the main window (centre), click on the OPC device or OPC UA device icon to select it.
  The OPC device or OPC UA device parameters are displayed in the main window (centre).
  In the Tag groups window (left), click on the "+ Tag group *n*" box to add a tag group to the device.
  The tag group is displayed in the main window (centre) and can be edited as required.

  Note: At any time, clicking on Return to systems (main window, centre, top right) will return to the main (home) view of the Systems tab/page. Similarly, the System window (right) can be used to switch between the system level and the device (interface) level.

  For example, configuring an OPC device tag group requires that the following parameters are configured, under the General tab:

  - Enabled, Name, Description, Update rate, Read mode.

  For example, configuring an OPC UA device tag group requires that the following parameters are configured, under the General tab:

  - Name, Enabled, Name, Description, Publishing interval.

- On the Systems tab/page, configure the individual OPC and/or OPC UA device tags for a tag group.

  In the main window (centre), click on the OPC device or OPC UA device icon to select it.
  The OPC device or OPC UA device parameters are displayed in the main window (centre).
  In the Tag groups window (left), click on a "Tag group *n*" box to select it.
  The tag group is displayed in the main window (centre).
  In the main window (centre), click on the Tags tab to select it.
  The Tags tab can be used to add and edit individual device tags as required.

  On the Tags tab, the Add control (bottom left) is used to add a new tag to a tag group.
  When a tag is added/selected (left), the main window (right) displays the information for the tag, which can be configured/edited as required by the application.
  Alternatively, the Import from CSV and/or Export to CSV controls can be used to import multiple tags from a comma-separated values (CSV) file, generated using software such as Excel®).

  Note: At any time, clicking on Return to systems (main window, centre, top right) will return to the main (home) view of the Systems tab/page. Similarly, the System window (right) can be used to switch between the system level and the device (interface) level.

When working with OPC device and/or OPC UA device configurations, the Consistency checks window (bottom) can be used to run and/or display consistency check information so that any problems in the VM600^{Mk2} system configuration can be corrected.

Also, the VibroSight Capture configuration is saved and activated in the usual way, that is, using the File > Save as server and/or the File > Apply changes to active configuration menu commands, as appropriate.

Finally, once the VibroSight Server is up and running, the Device driver required by the OPC device (OPC) and/or OPC UA device (OPC UA) must be enabled via the server's user interface, as appropriate.

2.6 VM600^{Mk2} MPC4^{Mk2} fault relay configuration

VibroSight 7.1.0 now allows the common circuit-fault relay (FAULT) of a VM600^{Mk2} MPC4^{Mk2} + IOC4^{Mk2} module to be driven by different inputs, depending on the requirements of an application.

NOTE:	Located on the IOC4^{Mk2} module, there is one common circuit-fault relay (FAULT) available for use by an application. This relay is automatically driven by the MPC4^{Mk2} module in order to indicate the status of the module/system, notably any problems detected by the MPC4^{Mk2} module's internal diagnostics (that is, built-in self-test (BIST)).

Basically, the input to the FAULT relay can now be configured to be driven by either:

• A failure in the MPC4 card or the VM600 power supply, or

• A failure in the MPC4 card or the sensor chains or the VM600 power supply.

(Previously, the input to the FAULT relay was always driven by "A failure in the MPC4 card or the VM600 power supply", that is, it was not configurable.)

The new option to drive the FAULT relay by "A failure in the MPC4 card or the sensor chains or the VM600 power supply" is similar to the existing option but also takes into the account the sensor / measurement chain OK checks on the MPC4^{Mk2} module itself.

2.7 VM600^{Mk2} MPC4^{Mk2} user-configurable relay configuration

VibroSight 7.1.0 now allows the user-configurable relays (RL1 to RL4) of a VM600^{Mk2} MPC4^{Mk2} + IOC4^{Mk2} module to be driven by different inputs, depending on the requirements of an application.

NOTE:	Located on the IOC4^{Mk2} module, there are four user-configurable relays (RL1 to RL4) available for use. This relays are free to be configured by the user, depending on the requirements of an application.

Basically, the input to a user-configurable relay can now be configured to be driven as follows:

• Via a logical function configured on the module.

• Via an individual status information bit related to the status of measurement channels or the module itself.

(Previously, the input to a user-configurable relay always had to be driven by a logical function.)

The new option to drive a user-configurable relay via individual status information bit means that it is now possible to drive a user-configurable relay without using a "dummy" logical function.

Note: Data validity flags have also been removed from the list of options (status information bits) that can be used as inputs to logical functions, as it is not recommended to drive relays with such information.

2.8 VM600^{Mk2} MPC4^{Mk2} sensor power supply defaults

VibroSight 7.1.0 now configures the sensor power supply for a VM600^{Mk2} MPC4^{Mk2} measurement channel with a default value (Disabled, +24 V$_{DC}$, −24 V$_{DC}$ or 6 mA) based on the sensor / measurement chain configured for the channel.

More specifically:

- For a vibro-meter sensor / measurement chain, the sensor power supply will use a default value that corresponds to the sensor / measurement chain.
  For example, for a measurement chain using an IPC70x signal conditioner, Sensor power supply: 24 [V], while for a measurement chain using an IQS900 signal conditioner, Sensor power supply: −24 [V], while for a measurement chain using an CE6xx, Sensor power supply: 6 [mA].

- For a generic (non-vibro-meter) sensor / measurement chain, the sensor power supply will be disabled by default. That is, Sensor power supply: Disabled.

2.9 Sensor catalog changes

The sensor catalogue used by VibroSight Protect for the configuration of sensor / measurement chains has been expanded to include even more vibro-meter sensor / measurement chains, including the latest versions of the recently introduced CE6xx and PV6xx general-purpose vibration sensors:

- CE630 and CE687 piezoelectric accelerometers.

- PV660 and PV685 piezoelectric velocity sensors.

Also in the sensor catalogue, in order to support machinery monitoring applications such as valve monitoring, two new physical quantities have been added:

- Stiffness with default units of kN/m.
  Configurable units: N/m, kN/m, MN/m or lb/in.

- Surface with default units of mm^2.
  Configurable units: m^2, km^2, cm^2, mm^2, in^2.

Finally, in the sensor catalogue, a new category/section for Other sensors has been added in order to allow users to more easily create and manage non-standard (generic) sensors / measurement chains.

Sensors / measurement chains created in the Other sensors category/section of the sensor catalogue can be used by the new custom processing functions/types (Custom dynamic and/or Custom quasi-static).

When creating a custom/other sensor in the Other sensors category/section of the sensor catalogue, any physical quantity available in the catalogue (from Acceleration to Weight ratio) can be used to help determine the sensor's sensitivity, while configuring the sensitivity in voltage or current units determines whether the sensor is voltage or current output. The sensor's range and offset can also be configured. Finally, the Sensor output type

(Dynamic (AC) or Quasi-static (DC)) must be selected in order to determine whether the sensor is suitable for use with the dynamic and/or auxiliary channels of a monitoring module (VM600^{Mk2}/VM600 and/or VibroSmart®).

Note: To access the Sensor catalog in VibroSight Protect (or VibroSight Capture), use the Tools > Sensor catalog menu command. In the Sensor catalog, the category/section of the sensor catalogue is changed using the drop-down control (top right), which shows Accelerometers as the default.

See also 0

VM600^{Mk2} MPC4^{Mk2} support for custom processing.

2.10   Sensor configuration improvements

The sensor catalogue used by VibroSight Protect for the configuration of sensor / measurement chains has been improved to allow the easier configuration of sensor / measurement chains.

More specifically, when adding a generic (non-vibro-meter) sensor / measurement chain, the parameters for the sensor / measurement chain are presented more visually, including a "transfer function" / "characteristic curve" that makes it easier to verify and understand the operation of the sensor / measurement chain.

Note: To access the Sensor catalog in VibroSight Protect (or VibroSight Capture), use the Tools > Sensor catalog menu command. To add a sensor / measurement chain to the Sensor catalog, use the Add control (bottom left) and select Add vibro-meter sensor chain or Add generic sensor chain, as appropriate.

2.11   VibroSight Protect configuration export

VibroSight Protect can now export a copy of a VM600^{Mk2} system configuration in a human-readable format in order to more easily support activities such as factory acceptance testing (FAT), manual comparison of configurations, system documentation and so on.

In VibroSight Protect, use the File > Export menu command to export the current configuration to the Excel® file format (*.xlsx).

In the Excel® file, the VibroSight Protect configuration is saved as a multi-sheet document as follows:

- One System layout sheet containing general rack/system information.
  (In general, the System layout sheet corresponds to the general rack/system information from the Layout tab/page in VibroSight Protect.)

- One Slot nn sheet per module containing more detailed configuration information. For example, card properties, channels (measurements), logical functions, relays and analog output information for a MPC4^{Mk2} + IOC4^{Mk2} module.
  (In general, the Slot nn sheets correspond to module specific information from the Configure tab/page, for the

selected module/slot, in VibroSight Protect.)

Note: One Slot nn sheet is exported per configured module / used rack slot in the VM600^{Mk2}/VM600 rack.)

2.12 VibroSight System Manager and VibroSmart PTP time synchronisation

VibroSight System Manager has been updated to support how VibroSmart® modules now use the precision time protocol (PTP) in order to improve measurement time synchronisation (<1 msec) between different VibroSmart modules for all types of measurements, in particular waveforms, when using a VibroSmart VSN010 real-time Ethernet switch as a PTP bridge.

More specifically, for a VibroSmart system using a VSN010 as a PTP bridge for other VibroSmart modules (VSV30x and VSI010), VibroSight System Manager is used to configure:

- For VSN010 time synchronisation:

    o PTP server: Domain (0-127), Transport (IPv4, Ethernet), Delay mechanism (P2P, E2E) and Offset compensation (-10,000 to +10,000 µsec)

    o NTP server: IP address

    o Disabled.

- For VSV30x and/or VSI010 time synchronisation:

    o VSN010 (indirect PTP master): Automatic synchronisation with the VSN010 in its measurement block

    o NTP server: IP address

    o Disabled.

In addition, VibroSight System Manager will display improved information in the Time synchronisation panel, displayed as part of the general/overall information in the main window (centre) when a VibroSmart module is selected.

See also 2.19 VSN010 module, 2.20 VSV301 + VSB300 module and 2.21 VSI010 + VSB010 module.

2.13 VibroSight Capture and MPC4^{Mk2} modules

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.

NOTE:	• VibroSight Protect supports the configuration and operation of machinery protection system (MPS) functionality for a VM600^{Mk2} system (MPC4^{Mk2} + IOC4^{Mk2}, RLC16^{Mk2} and CPUM^{Mk2} + IOCN^{Mk2} modules). • VibroSight Capture supports the configuration and operation of condition monitoring system (CMS) functionality for a VM600^{Mk2} system (MPC4^{Mk2} + IOC4^{Mk2}modules).

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 (MPC4^{Mk2} CMS license) to a version of the module without condition monitoring enabled (using VibroSight System Manager).

For example, a VibroSight / VM600^{Mk2} MPC4^{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.

Starting with VibroSight 7.1.0, VibroSight Capture now checks all MPC4^{Mk2} modules in a configuration/system to verify if they have a valid condition monitoring license (MPC4^{Mk2} CMS license) before working with the modules in order to limit the functionality and presentation of information in VibroSight Capture accordingly.

(Previously, VibroSight Capture assumed and treated all MPC4^{Mk2} modules as if they had a valid condition monitoring license (MPC4^{Mk2} CMS license).)

Now, for a MPC4^{Mk2} module that does not have a valid condition monitoring license (MPC4^{Mk2} CMS license), VibroSight Capture will no longer display any condition monitoring system (CMS) information such as condition monitoring specific measurement processing and outputs.

However, VibroSight Capture will continue to allow access to the machinery protection system (MPS) information for a MPC4^{Mk2} module, such as machinery protection specific measurement processing and outputs. Importantly, this allows the MPS-related data (specifically, static measurement data) to be logged to a VibroSight database.

2.14   VibroSight Vision and Trend plots against speed and against time

In VibroSight Vision, for the display of Trend plots against speed (Speed/Bode), a new speed-specific decimation algorithm is now being used in order to optimise the display of data against speed.

(Previously, for the display of Trend plots against speed (Speed/Bode), the decimation applied was the same as for the display of Trend plots against time (Time/APHT), which was not entirely suitable and sometimes resulted in measurements not being displayed.)

Similarly, in VibroSight Vision, for the display of Trend plots against time (Time/APHT), the existing decimation algorithm used has been improved in order to further optimise the display of data against time. More specifically, for curves displaying elapsed time, the same number of points are used per curve.

NOTE:	Elapsed time is used when multiple machine states or alarms are selected for the time range. When elapsed time is used, a curve is created per selected time period, with all curves starting from 0 seconds (x-axis), in order to allow for easier data comparisons. For example, this is open used compare multiple runups and/or rundowns of a machine.

Further, to allow for the customisation of the new speed-specific decimation, a user-configurable performance limit has been added to the VibroSight Vision options that allows the maximum number of measurement points used for plots against speed to be limited.

To access the VibroSight Vision performance limits, use the Tools > Options menu command and in the Options window that is displayed, click Performance (left) to display the performance limits information.

Under Plot data display limits:

- Maximum plot dynamic data items: 250 (default value)
  Defines the maximum number of waveforms, spectra or orbits that can be displayed in a plot.

- Maximum data items for curves in function of speed: 4000 (default value)
  Defines the maximum number of points that can be displayed in each static curve in a plot displayed against speed.
  Note: This is the new limit used for the display of Trend plots against speed (Speed/Bode).

2.15   Machinery view changes

In the Machinery view window, the hierarchical tree structure used to display information about the machinery being monitored has been improved such that only machine train components that have measurement points attached are now displayed.

NOTE:	For a VibroSight system, VibroSight Capture is used to create a Machinery view. In VibroSight Capture, on the Machinery tab/page, create a machine train and add machinery components (such as machines, bearings, couplings and shafts) to it, then on the Connect tab/page, associate (connect) these components with their associated measurement points (defined in VibroSight Protect).

This Machinery view change was made in order to make it easier to navigate and work with the Machinery view in VibroSight software modules that use it, notably, VibroSight Vision, VibroSight Mimic and VibroSight Event Viewer.

VM600^{Mk2} modules

2.16 MPC4^{Mk2} + IOC4^{Mk2} module

Updated VM600^{Mk2} MPC4^{Mk2} + IOC4^{Mk2} machinery protection and condition monitoring module firmware with the following main improvements:

Machinery protection firmware: `640-025-006-000`

NOTE:	VM600^{Mk2} MPC4^{Mk2} machinery protection firmware (640-025-006-000) is only compatible with MPC4^{Mk2} modules with PNR 600-041-000-002 or later.
	Uploading this machinery protection firmware (640-025-005-000) to earlier versions of hardware (MPC4^{Mk2} modules with PNR 600-041-000-001) will result in a module stuck in the Power-up operating mode.

Features:

- Support for hydro air-gap monitoring and analysis for machinery protection
  Air-gap processing is now supported by the module's dynamic channels (CH1-CH4).
  See also 2.1 VM600^{Mk2} MPC4^{Mk2} support for hydro air-gap monitoring and analysis.

- Support for shaft absolute vibration processing for machinery protection
  Shaft absolute vibration (SAV) processing, more specifically X-Y bearing absolute vibration, is now supported by the module's dynamic channels (CH1-CH2 and CH3-CH4).
  Note: X-Y bearing absolute vibration processing is a dual-channel processing that uses accelerometers or velocity sensors as inputs. It is similar to X-Y shaft relative vibration processing, another dual-channel processing, that uses proximity sensors as inputs.
  See also 2.2 VM600^{Mk2} MPC4^{Mk2} support for shaft absolute vibration processing.

Support for custom processing for machinery protection
Custom dynamic processing is now supported by the module's dynamic channels (CH1-CH4). Custom quasi-static processing is now supported by the module's auxiliary channels (AX1-AX2).
See also 0

- VM600^{Mk2} MPC4^{Mk2} support for custom processing.

- Improved fault-relay configuration/operation
  See also 2.6 VM600Mk2 MPC4Mk2 fault relay configuration.

- Improved user-configurable relay configuration/operation
  See also 2.7 VM600Mk2 MPC4Mk2 user-configurable relay configuration.

- Improved adaptive monitoring
  For adaptive monitoring, used to change alarm limits as a function of a control parameter, when using multiple coefficients (Trip multiplier bands), the configured bands no longer need to be contiguous (adjacent), thereby making configuration easier. Also, every processing measurement output compatible with adaptive monitoring now uses a flag to indicate if a trip multiplier is active.

NOTE: A trip multiplier can become active due to either adaptive monitoring (control parameter) or activation of the external discrete signal interface (DSI) Trip multiply (TM) control input.

- Common module status bits
A number of new common module status bits have been created in order to make it easier to monitor the ststus of modules logical functions
• Common alert – the logical OR of all the "Alert+" and "Alert–" for all measurements in all channels within the MPC4 module.
• Common danger – the logical OR of all the "Danger+" and "Danger–" for all measurements in all channels within the MPC4 module.
• Common sensor NOK check – the logical OR of all the "Sensor NOK check" for all channels within the MPC4 module.
NOTE: Previously, these common module status bits had to be created manually using logical functions.

Bug fixes:

- Module saturation level detection (BIST) for AC-coupled signals was too low.
- Save diagnostics log (VibroSight System Manager) was not working if module configuration files (protection or monitoring) were too big.
- MPC4^{Mk2} module no longer activates the system-wide VM600^{Mk2} MPS safety-line control signal in fail-safe mode, also known as the "Redline", that automatically drives all system relays (IOC4^{Mk2} and RLC16^{Mk2}) and analog outputs (IOC4^{Mk2}) to a safe state.
- For Adaptive monitoring using speed as the control parameter, the flag (ADAPTIVE_INVALID) associated with the associated speed was not becoming active when there was a speed sensor / measurement chain problem (sensor NOK check).
- Module with normally energised (NE) relays incorrectly entering the fail-safe mode/state following a reconfiguration (VibroSight Protect) or firmware upgrade (VibroSight System Manager).
- Using the IP settings (VibroSight System Manager) to change the IP address of an MPC4^{Mk2} + IOC4^{Mk2} module not working correctly due to "locked" modules always responding.
- Improved filtering for an ADC (XADC) on the IOC4^{Mk2} module to better suppress glitches and reduce noise on DC measurements.
- Changing IP address of Cards/Modules reports that module is locked.
- Improve XADC glitch filtering on DC channels.

Condition monitoring firmware: `640-033-002-000`

NOTE:	VM600^{Mk2} MPC4^{Mk2} condition monitoring firmware (640-033-001-000) is only compatible with machinery protection firmware (640-025-006-000), and with MPC4^{Mk2} modules with PNR 600-041-000-002 or later.

Features:

- Support for hydro air-gap monitoring and analysis for condition monitoring
  Air-gap processing is now supported by the module's dynamic channels (CH1-CH4).
  See also 2.1 VM600^{Mk2} MPC4^{Mk2} support for hydro air-gap monitoring and analysis.

- Support for shaft absolute vibration processing for condition monitoring
  Shaft absolute vibration (SAV) processing, more specifically X-Y bearing absolute vibration, is now supported by the module's dynamic channels (CH1-CH2 and CH3-CH4).
  Note: X-Y bearing absolute vibration processing is a dual-channel processing that uses accelerometers or velocity sensors as inputs. It is similar to X-Y shaft relative vibration processing, another dual-channel processing, that uses proximity sensors as inputs.
  See also 2.2 VM600^{Mk2} MPC4^{Mk2} support for shaft absolute vibration processing.

Support for custom processing for condition monitoring
Custom dynamic processing is now supported by the module's dynamic channels (CH1-CH4). Custom quasi-static processing is now supported by the module's auxiliary channels (AX1-AX2).
See also 0

- VM600^{Mk2} MPC4^{Mk2} support for custom processing.

Bug fixes:

- Condition monitoring configurations containing an auxiliary channel with custom quasi-static processing or a remote tacho being rejected.
- Condition monitoring configurations containing an integration (for example, from acceleration to velocity) not being processed correctly with the result that no integration was being performed.

2.17 CPUM^{Mk2} + IOCN^{Mk2} module

Updated VM600^{Mk2} CPUM^{Mk2} + IOCN^{Mk2} rack controller and communications interface firmware with the following main improvements and bug fixes:

Base-system / Applications firmware: `640-034-002-000`

Features:

- Support for PROFIBUS identification number
  An Ident Number (ID number) can now be added to a PROFIBUS fieldbus configuration file. For example:
  PROFIBUS_IDENT=0x0FBE
  where 0x0FBE is the Meggitt identifier (our default value).
  (The PROFIBUS_IDENT command goes in the [GLOBAL] section of the PROFIBUS configuration file, after the IS_PROFIBUS_ACTIVATED command.)
  Note: This change was made for consistency between the VM600^{Mk2} CPUM + IOCN module and the VM600 CPUR2 + IOCR2 module, thereby allowing easier upgrades from VM600 CPUR2 to VM600^{Mk2} CPUM.

See also 5.2 VM600^{Mk2}/VM600 modules/cards.

VM600 modules

2.18 CPUR2 + IOCR2 module

Updated VM600 CPUR2 + IOCR2 rack controller and communications interface firmware with the following main improvements and bug fixes:

Base-system firmware: `640-014-001-006` and **Applications firmware: `640-015-001-006`**

Features:

- Support for up to two Modbus TCP servers running in parallel.
  For example, this allows one server to be allocated to the communication of vibration data (MPC4) and one server to be allocated to the communication of combustion data (XMC16).

Bug fixes:

- For MPC4 (and AMC8) card configurations updated via the VM600 MPS1 software, FSD and USED data/fields were not subsequently updated/displayed correctly via Modbus TCP or PROFIBUS DP.
  Note: This bug only affected Modbus / PROFIBUS and disappeared after a reboot of the VM600^{Mk2}/VM600 rack.

See also 5.2 VM600^{Mk2}/VM600 modules/cards.

VibroSmart modules

2.19 VSN010 module

Updated VibroSmart VSN010 real-time Ethernet switch module firmware with the following main improvements and bug fixes.

VSN010: `642-004-000-012`：

Features:

- New PTP time bridge feature for use with an external PTP IEEE 1588 reference clock (PTP master), that allows other VibroSmart modules (VSV30x and VSI010) to use the VSN010 module as a PTP time reference (indirect synchronisation with PTP master).
  Note: A measurement block is now indirectly PTP synchronised with the VSN010 module broadcasting the time offset between the measurement block (HSR ring) time and the external reference clock time.

See also 5.3 VibroSmart devices.

2.20 VSV301 + VSB300 module

Updated VibroSmart VSV301 + VSB300 monitoring module firmware with the following main improvements and bug fixes.

VSV301: `642-001-000-020`:

Features:

- Time synchronisation with a VSN010 module acting as a PTP bridge (indirect synchronisation with PTP master).

- Time synchronisation <1 msec between different modules for all types of measurements, in particular waveforms, when using a VSN010 as a PTP bridge.

Bug fixes:

- In order to eliminate waveform phase variations sometimes seen with VibroSmart VSV30x modules, a reference flag was added to waveforms to improve synchronisation between waveform and speed/tacho pulse signals in VibroSight.

- Problems activating configurations on VibroSmart VSV30x modules containing Asynchronous absolute bearing vibration (AAB) processing.

- Improved module event logging such that new events are correctly handled at startup (stored in local flash memory) and the time of the last event is no longer used to update the module time.

- Sensor OK indication displayed by VibroSight Scope not always correct and not always corresponding to the measured DC value (always correct).

See also 5.3 VibroSmart devices.

2.21 VSI010 + VSB010 module

Updated VibroSmart VSI010 + VSB010 communications interface module firmware with the following main improvements and bug fixes.

VSI010: `642-002-000-014`:

Features:

- Time synchronisation with a VSN010 module acting as a PTP bridge (indirect synchronisation with PTP master).

- Improved support for the GOOSE (IEC 61850) communications protocol, including a new Tmin parameter that limits the burst repeat speeds if the deadband is exceeded a second time.

Bug fixes:

- General stability improvements and bug fixes related to the GOOSE (IEC 61850) communications protocol.

See also 2.12 VibroSight System Manager and VibroSmart PTP time synchronisation and 5.3 VibroSmart devices.

3 Solved problems and bug fixes

3.1 General improvements and bug fixes

General stability improvements and bug fixes across the VibroSight 7.1.0 software.

3.2 Incorrect Raw bus line used to drive a RLC16^{Mk2} relay

In VibroSight Protect, when using a VM600^{Mk2} MPC4^{Mk2} module's logical function to drive relay 11 (RL11) on a RLC16^{Mk2} module, an incorrect Raw bus line was used (that is, Raw bus line 43 was used when it should have been line 45).

3.3 Incorrect tacho could be selected as a speed reference

In VibroSight Capture, when configuring condition monitoring functionality for a VM600^{Mk2} MPC4^{Mk2} module, it was possible to select a condition monitoring speed reference from another MPC4^{Mk2} module that was not actually connected to the first MPC4^{Mk2} module via the Tacho bus.

However, in VibroSight Capture, it is not possible to change Tacho bus configurations as they are part of the machinery protection functionality and so must be configured in VibroSight Protect. That is, in VibroSight Capture, it is now only possible to select a condition monitoring speed reference that is either local (on the same MPC4^{Mk2} module), or remote and already shared/linked via the Tacho bus (from another MPC4^{Mk2} module).

3.4 Inconsistent treatment of VibroSight Protect and VibroSight Capture configurations after updates

VibroSight Protect and VibroSight Capture handled updates (changes to VibroSight software components/packages) slightly differently such that following a software update, VibroSight Protect might not request the user to re-activate the configuration on a device whereas VibroSight Capture would automatically include updated information (on components/packages) in any VibroSight Server that was created.

Accordingly, this could result in issues when the configuration running on a module (readback) was compared with the configuration running on a server.

Note: As a workaround, the user could always just re-activate the configuration on a device, accepting that there were no changes (user-made) to the configuration.

3.5 VibroSight System Manager

Under certain circumstances, VibroSight System Manager inadvertently consumed too many computer resources (up to of 99% of CPU and 30 GB of memory), effectively preventing other software, such as a VibroSight Server, from running correctly.

3.6 Math processing block missing configuration elements

In VibroSight Configurator, for a VibroSight Server, the user interface for the Math processing block ("Custom mathematical calculation engine") was missing an element/feature.

More specifically, when configuring a Scalar data entity level, under Mathematical expression, the "Available elements" block/window was missing, which made it more difficult to know which functions, constants and operators were available in the maths library, and to add any of these elements to an expression.

3.7 Differential shaft expansion consistency check error

In VibroSight Protect, when configuring a VM600^{Mk2} MPC4^{Mk2} module to measure differential shaft expansion using the dual-channel processing function Differential expansion (single taper), setting the Ramp angle (α) to 5° resulted in a consistency check error, even though 5° is a permitted value.

3.8 Inconsistent treatment of the Hardware and Machinery views in VibroSight Vision and VibroSight Mimic

The information displayed in the Hardware view and the Machinery View in VibroSight Vision and VibroSight Mimic was slightly different, as the input channel node levels were missing from the views displayed in VibroSight Mimic. This has now been corrected such that VibroSight Mimic also includes input channel node level information.

3.9 Shaft axial position measurements with auxiliary channels

In VibroSight Protect, for the VM600^{Mk2} MPC4^{Mk2} module, it is now possible to measure shaft axial position using the single-channel processing function Shaft axial position (shaft end) with auxiliary channels (AX1-AX2).

(Previously, the Shaft axial position (shaft end) processing function was only available for dynamic channels (CH1-CH4)).

4 Known issues

4.1 Security risks

A number of Open web application security project (OWASP) security risks have been identified related to a UPC UA library used by the VibroSight software. This UPC UA library is from a third-party (Softing AG, Softing Industrial Automation GmbH) who are working on a fix. However the improved UPC UA library is not available in time for the release of VibroSight 7.1.

For information, the specific issues that have been identified are:

- CVE-2022-29862: An infinite loop in OPC UA .NET Standard Stack 1.04.368 allows a remote attackers to cause the application to hang via a crafted message

- CVE-2022-29863: OPC UA .NET Standard Stack 1.04.368 allows remote attacker to cause a crash via a crafted message that triggers excessive memory allocation.

- CVE-2022-29864: OPC UA .NET Standard Stack 1.04.368 allows a remote attacker to cause a server to crash via a large number of messages that trigger Uncontrolled Resource Consumption.

- CVE-2022-29865 : OPC UA .NET Standard Stack 1.04.368 allows a remote attacker to bypass the application authentication check via crafted fake credentials

- CVE-2022-29866: OPC UA .NET Standard Stack 1.04.368 allows a remote attacker to exhaust the memory resources of a server via a crafted request that triggers Uncontrolled Resource Consumption.

4.2 Display of timestamps in VibroSight Vision

In VibroSight Vision, when the timestamps (date and time) are configured to be displayed as Site time or Local computer time and the site time or local computer time is subsequently changed on the relevant computer (for example, using Windows > Control Panel > Date and Time), this change is not reflected in the VibroSight Vision user interface until the user clicks on the **Timestamp** displayed in the VibroSight Vision status bar.

4.3 VibroSight Server and Host Service restart required after changes to network adapter

If the configuration of a network adapter is changed (for example, enabled or disabled, connected or disconnected) on a computer running VibroSight, then the VibroSight Servers and Host Services running on the computer must be restarted in order for the network adapter to be recognized by the VibroSight discovery mechanism.

4.4 Length limitation of VibroSight Server instance names

Since VibroSight 2.9.6, VibroSight Server instance names are limited to 18 characters, whereas up to 27 characters were allowed in previous versions. This constraint is enforced during the creation of new server instances with VibroSight 2.9.6 or later.

NOTE:	VibroSight allows only alphanumeric characters (A to Z, a to z, 0 to 9), the hyphen-minus character (-) and the underscore character (_) to be used for VibroSight Server names.

However, existing server instances may be non-compliant (too long) and no longer run after an upgrade of the VibroSight software. In such cases, the file names used for a VibroSight Server database file (*.vssrvdb or *.db) and a VibroSight Server configuration file (*.vssrvcfg or *.config) should be updated (and manually edited in the VibroSight configuration file) to be 18 characters or less. Changes may also be required in any VibroSight software that references the server instance name, such as VibroSight Vision projects.

Where used, the automated data management commands and operations that append a timestamp (_yyyyMMddHHmmss) to the Server instance name reduces the number of file name characters that remain available for VibroSight Server instance names to three. Alternatively, the server instance name can be shorted after the data repository command or operation is complete.

Also, depending on the VibroSight Server data repository (database) file names used and any truncation performed by VibroSight, it is possible that servers are created with names that contain non-allowed characters (such as spaces), with the result that these servers will not be accessible by VibroSight software clients. Similarly, duplicate VibroSight Server names are also possible.

NOTE:	Choose appropriate VibroSight Server names in order to avoid name conflicts arising due to truncation and/or additional data repositories being created during automatic data management.
	This is particularly important for systems with automated data management and system backup procedures that can generate VibroSight Server data repositories with different file names.

4.5 Display of timestamps in VibroSight clients other than VibroSight Vision

Although VibroSight Vision now supports the display of timestamps (date and time) as either Site time, UTC time or Local computer time, all other VibroSight client software modules continue to display timestamps in local computer time only (that is, the date and time according to the local clock of the computer running the VibroSight software module).

4.6 Display of devices in VibroSight System Manager

In the System Explorer window of VibroSight System Manager, the Devices tree-view does not always update correctly to show all of the devices (VM600 modules/cards and VibroSmart devices) available on the network.

In particular, this has been seen when changing the firmware of a device, and can persist even after a refresh (using the **Refresh** toolbar button or **View > Refresh**).

If this behaviour is seen, the recommended workaround is to:

- Wait a few minutes and refresh again.

- Restart VibroSight System Manager.

4.7 VibroSight Mimic backwards compatibility

VibroSight 2.10.0 contained significant improvements and changes, including a separate VibroSight Mimic client software module for mimics (that were previously available in VibroSight Vision). As a result, VibroSight Vision mimics created with VibroSight 2.9.7 or earlier are not compatible with VibroSight 2.10.0 or later.

VibroSight 2.11.0 contained significant improvements and changes to the VibroSight Mimic client software module. As a result, VibroSight Vision mimics created with VibroSight 2.10.1 or earlier are not compatible with VibroSight 2.11.0 or later.

VibroSight 2.11.5 contained significant improvements to the VibroSight Mimic project framework to include version information, in order to improve the compatibility between projects created with different versions of VibroSight Mimic and eliminate the requirement for the recreation of Mimics. Starting with VibroSight 2.11.5, Mimic projects automatically detect any changes in the VibroSight Mimic software that affect project compatibility, inform the user and update the project as required.

NOTE:	VibroSight 2.11.5 is also able to open and work with Mimic projects created with VibroSight 2.11.0 or later, if the corresponding database had been updated as required.

NOTE:	When updating existing machinery monitoring projects created with VibroSight 2.12.x to VibroSight 3.x.x or later, a new data repository created by copying a VibroSight database (*.vssrvdb) to a VibroSight historical data folder (*.vshdf) must use the same server file name as the existing server in order for existing VibroSight Mimics to maintain links with the data repository and continue to work (without manual corrections). In addition, the VibroSight Server using the new data repository must be running before the existing VibroSight Mimics are run for the first time, after the update.

4.8 VibroSight OPC Clients not recovering

When a VibroSight OPC Client is being used to import information from an external OPC server into a VibroSight system and the external OPC server becomes unavailable, the VibroSight OPC Client may not always recover automatically when the OPC server becomes available again.

This is typically characterised by the VibroSight OPC Client continuing to show connection error messages even when OPC server is available and can result in permanent loss of the imported data if not noticed.

NOTE:	The external OPC data can be permanently lost if it is not imported into VibroSight as expected.
	Any VibroSight system feature or configuration element relying on the imported OPC data will not behave as expected, for example, alarms, machinery operating conditions and data logging rules.

If this behaviour is seen, the recommended workaround is to:

- Stop and restart the VibroSight OPC Client from either the VibroSight Server (**Data > Acquisition > OPC Device Driver**) or VibroSight System Manager.

- Stop and restart the VibroSight Server, if required.

4.9 Duplicate events

For VibroSight systems using VM600 XMx16 cards, VibroSight Event Viewer retrieves all of the event information available from the data buffers on the cards.

For VibroSight systems using VibroSmart modules, VibroSight Event Viewer retrieves the event information available from the current time only (no buffered events).

Accordingly, for a VibroSight system using VM600 XMx16 cards, there is the possibility of duplicate events being listed in the Event Viewer, particularly for VibroSight systems being operated without an NTP server (where events are not recognised as duplicates due to time drift).

4.10 VibroSight Server status indicators

The status indicators (performance counter monitors) on the Status tab of the new VibroSight Server are not correctly displayed and updated when an NVIDIA WMI driver is installed on the same computer as the VibroSight Server.

NOTE:	The NVIDIA Enterprise Management Toolkit (NVWMI) is a graphics and display management and control technology that interfaces to Microsoft's Windows Management Instrumentation (WMI) infrastructure, specific to NVIDIA graphics processing units (GPUs).

This is because NVIDIA WMI prevents the Microsoft .NET Framework from obtaining the required counter values from the underlying operating system / computer.

4.11 XMx16 card pre-logging

For an XMx16 card pair, if Dynamic Input Channel 16 is used as an input to a Dynamic Processing Block that is used as an input to a Dual Shaft Relative Processing Block which is configured to provide an Orbit and/or Full Spectrum output, then any pre-logging configured for the principal mode Waveform and/or Spectrum of Dynamic Input Channel 16 will not actually log any of the data from the same pre-logging scope.

4.12 Problems creating new VibroSight OPC Classic Servers

Users who have upgraded from an earlier version of VibroSight to a later version (for example, from VibroSight 2.x.x or 3.0.0 to VibroSight 3.1.0) can experience problems when creating new VibroSight OPC Classic Servers.

Such problems are typically characterised by the **OPC Server Create** command in VibroSight System Manager displaying an error message such as
"The type initializer for 'ch.VibroMeter.Xms.OpcServer.Utils.OpcServerUtils' threw an exception".

This typically occurs because an earlier version of the OpcServer.config file required by VibroSight OPC Classic Servers is being used by the later installation of VibroSight, which can happen in one of two ways:

- When a version of VibroSight 3.x.x or later is installed on a computer that was running a version of VibroSight 2.x.x or earlier, the VibroSight installer automatically checks existing VibroSight folders (such as **C:\ProgramData\Meggitt\VibroSight 2**) in order to copy relevant system and/or user preference files across to the new VibroSight folders (such as **C:\ProgramData\Meggitt\VibroSight**), including an earlier OpcServer.config file.

- When VibroSight 3.1.0 is installed on a computer that was running VibroSight 3.0.0, the creation of a VibroSight OPC Classic installer using VibroSight 3.0.0 automatically created an earlier OpcServer.config file.

As shown below, the first few lines of a typical OpcServer.config file contains version specific information that is incompatible with later versions of VibroSight:

<?xml version="1.0" encoding="utf-8"?>

<configuration>

  <configSections>

    <section name="opcServersConfiguration" type="ch.VibroMeter.Xms.OpcServer.Utils.OpcServersSystemConfiguration, XmsOpcServerUtils, Version=2.0.0.0, Culture=neutral, PublicKeyToken=2db2a2387bac0a0a" />

  </configSections>

…

</configuration>

So for users who have upgraded from an earlier version of VibroSight to a later version, if problems are experienced when creating new VibroSight OPC Classic Servers, the workaround is to:

1. Use an XML-compatible text editor program to edit the OpcServer.config file and remove the version specific information. That is, change the line containing the section name
from:

<section name="opcServersConfiguration" type="ch.VibroMeter.Xms.OpcServer.Utils.OpcServersSystemConfiguration, XmsOpcServerUtils, Version=2.0.0.0, Culture=neutral, PublicKeyToken=2db2a2387bac0a0a" />

to:

<section name="opcServersConfiguration" type="ch.VibroMeter.Xms.OpcServer.Utils.OpcServersSystemConfiguration, XmsOpcServerUtils, Culture=neutral, PublicKeyToken=2db2a2387bac0a0a" />

2. Restart the computer.
    Note: The computer must be restarted to ensure that the edited version of the OpcServer.config
    file is used (and not some other version from cache memory).

3. Use the **OPC Server Create** command in VibroSight System as required.

NOTE:	The manual migration of existing VibroSight OPC Classic Servers to VibroSight 3.x.x or later is described in detail in the "VibroSight OPC Classic Server migration" section of the latest 📄 *Getting started with VibroSight installation guide*.

4.13 Potential TCP port 50000 conflict

The VibroSight Host Service (XmsHostService.exe) requires TCP port 50000 for communication with the VibroSight software. So if the computer running the VibroSight software is running other software which also requires TCP port 50000, this results in a TCP port conflict which can prevent VibroSight (or the other software) from running.

During the VibroSight software installation process, the VibroSight 3.4.x or later installer will typically detect other software on the computer that is using TCP port 50000 and report this. For example: "The port 50000 cannot be used. Please close all application using this port before manually starting the host service."

Accordingly, any potential TCP port 50000 conflicts should be resolved before the VibroSight software can be successfully installed and run.

4.14 Problems using shared network drives/locations for VibroSight data management

On computers running Windows 10 or Windows Server 2016, problems can be experienced using shared network drives/locations with VibroSight's integrated data management operations such as Offline data storage and Database backup (configured in VibroSight Configurator) due to Windows security policies and restrictions.

Such problems are typically characterised by the individual copy commands scheduled and run on a VibroSight Server (corresponding to Offline data storage and Database backup operations) failing to run correctly. More specifically, on the Data Management tab of a VibroSight Server, scheduled incremental copy jobs (Type: Copy) are typically displayed with Status: Error, while the Log Messages tab of the server display typically displays messages such as "Errors during the copy operation" and "Uncaught error IOException occurred in task 'Task "DataRepositoryCopyDataMan…".

NOTE:	For Windows 10 and Windows Server 2016, Microsoft improved network security with a change to the rules governing shared network drives/locations. More specifically, a shared network drive/location is now only accessible and visible to the user who created the shared network drive/location, even if the user is an Administrator.

Accordingly, in order to avoid such problems, a shared network drive/location on Windows 10 and Windows Server 2016 computers that is required to be used by VibroSight's integrated data management operations should be created as a "system account" in order to ensure that the required Windows Services can access the shared resource (drive/location).

This can easily be done using [Microsoft's PsExec utility](#). For example, by running the following command (as an Administrator):

PsExec.exe -i -s cmd.exe /C "net use Z: \\server\share"

Where the net use command is used to map the \\computer name\sharename (\\server\share) to the devicename (Z:).

NOTE: For Windows 10 and Windows Server 2016, Microsoft improved network security with a change to the rules governing shared network drives/locations.
More specifically, a shared network drive/location is now only accessible and visible to the user who created the shared network drive/location, even if the user is an Administrator.

4.15 Problems installing VibroSight 3.7.x on computers without internet access

On computers which are not connected to the internet, the VibroSight 3.7.x installer can experience problems when automatically installing the prerequisite Microsoft Visual C++ Redistributable Package for Visual Studio 2015, and report a generic message such as "Setup Failed. One or more issues caused the setup to fail".

As a workaround, trying to manual install the Microsoft Visual C++ Redistributable Package for Visual Studio 2015, the Microsoft Visual C++ installer can also experience problems, and report a similar generic "Setup Failed" message.

This is a known Microsoft problem which is due to some components in Visual Studio being signed by a certification authority that is not installed on the computer, and the computer cannot automatically download the required certificate(s) because it is not connected to the internet.

Accordingly, the Microsoft solution is to:

1. On a computer which is connected to the internet, download the following certificate:
    http://www.microsoft.com/pki/certs/MicRooCerAut2011_2011_03_22.crt
    Then copy the certificate to the VibroSight computer (for example to C:\Temp).

2. On the VibroSight computer, use the certmgr.exe utility to add the certificate by using the command line.
    Note: For more information, refer to the Certmgr.exe (Certificate Manager Tool) topic at MSDN.

3. Open an admin command prompt and run the following command:
    certmgr.exe /add C:\Temp\MicRooCerAut2011_2011_03_22.cer /s /r localMachine root

4.   Next, try installing the patch KB3135996 or KB3136000.

If required, additional information is available from a Microsoft MSDN blog, here:
https://blogs.msdn.microsoft.com/vsnetsetup/2016/03/28/a-certificate-chain-could-not-be-built-to-a-trusted-root-authority-2

5 Compatibility

As part of the VibroSight software installation process, the VibroSight installer will automatically check to see if the required Microsoft .NET Framework, Microsoft Visual C++ Redistributable Package, OPC Core Components Redistributable software and OPC UA Local Discovery Server are pre-installed on the computer:

- The required Microsoft Visual C++ Redistributable Package (see section 5.1.3) must be manually installed before VibroSight can be installed. If it is not detected, then the VibroSight installer will exit the installation and VibroSight is not installed.

- The required Microsoft .NET Framework (see section 5.1.2) is automatically installed by the VibroSight installer if it is not detected.

- The required OPC Core Components Redistributable (see section 5.1.4) software is automatically installed on the computer by the VibroSight installer if it is not detected.

- The required OPC UA Local Discovery Server (see section 5.1.5) software is automatically installed on the computer by the VibroSight installer if it is not detected.

> **NOTE:** Refer to the latest version of the 📄 *Getting started with VibroSight installation guide* or the 📄 *VibroSight software data sheet* for further information on VibroSight's prerequisites and compatibility.

5.1 VibroSight software

VibroSight 7.1.0 is a minor level release and replaces VibroSight 7.0.x.

Compatibility with existing VibroSight data repositories (databases) is achieved using a specific data migration process from any existing databases based on Sybase SQL Anywhere (*.vssrvdb) to data repositories based on the VibroSight historical data repositories (VibroSight historical data folder (*.vshdf) for operation with a VibroSight Server (live data) and VibroSight historical data archive (*.vshda) for operation with historical data).

Compatibility with existing VibroSight machinery monitoring projects using VibroSight OPC Servers that were created using VibroSight 2.12.7 or earlier is achieved using a specific VibroSight OPC Server migration process for these VibroSight OPC Servers.

Therefore, it is important to note that:

- New machinery monitoring projects created with VibroSight 7.x.x (VibroSight 3.x.x or later) will automatically use VibroSight historical data repositories.

- Existing machinery monitoring projects created with versions of VibroSight earlier than VibroSight 3.0.0 must be manually migrated from Sybase SQL Anywhere databases to VibroSight historical data repositories before they can be used with VibroSight 7.x.x (VibroSight 3.x.x or later).

- Existing machinery monitoring projects using VibroSight OPC Servers that were created with versions of VibroSight earlier than VibroSight 2.12.7 must manually migrate their VibroSight OPC Servers before they can be used with VibroSight 7.x.x (VibroSight 3.x.x or later).
  It is very important to note that migrating a VibroSight OPC Server from VibroSight 2.12.7 or earlier to

VibroSight 7.x.x (VibroSight 3.x.x or later) or later requires that certain steps must be performed using the existing version of VibroSight (that is, VibroSight 2.12.7 or earlier) BEFORE it is removed (uninstalled).

NOTE:	The manual migration of an existing machinery monitoring project to VibroSight 7.x.x (VibroSight 3.x.x or later) or later is described in detail in the "Data migration" and "VibroSight OPC Server migration" sections of the latest *Getting started with VibroSight installation guide.*

5.1.1 Microsoft Windows operating systems

VibroSight 7.x.x (VibroSight 3.x.x or later) or later is compatible with 32-bit versions and 64-bit versions of Microsoft ® Windows ® operating systems.

NOTE:	Starting with VibroSight 3.0.0, VibroSight software is now available as 64-bit software for 64-bit Windows and 32-bit software for 32-bit Windows. The 64-bit version of VibroSight can be installed on 64-bit Windows computers only. The 32-bit version of VibroSight can be installed on 32-bit Windows computers only. Only a single version of VibroSight can be installed and exist on a computer at any one time

See the Appendix of these release notes for further information on VibroSight software and Windows operating system compatibility.

5.1.2 Microsoft .NET Framework

For most Windows operating systems, VibroSight 7.x.x (VibroSight 3.7.0 or later) requires that the Microsoft .NET Framework 4.7.2 or later is installed.

NOTE:	VibroSight 7.x.x requires Microsoft .NET Framework 4.7.2.

If the required Microsoft .NET Framework is not pre-installed, then the VibroSight installer will detect this and automatically install it as part of the VibroSight software installation process.

See the Appendix of these release notes for further information on VibroSight software and Microsoft .NET Framework requirements.

5.1.3 Microsoft Visual C++ Redistributable Package

VibroSight 7.x.x (VibroSight 3.x.x or later) requires that the Microsoft Visual C++ Redistributable Package for Visual Studio 2015 is installed, in order to install and register the Visual C++ libraries used by VibroSight.

NOTE:	The 64-bit version of the Microsoft Visual C++ Redistributable Package ("Microsoft Visual C++ 2015 Redistributable (x64)") must be installed on 64-bit Windows computers.
	The 32-bit version of the Microsoft Visual C++ Redistributable Package ("Microsoft Visual C++ 2015 Redistributable (x86)") must be installed on 32-bit Windows computers.

If the required Microsoft Visual C++ Redistributable Package is not pre-installed, then the VibroSight installer will detect this and exit the installation.

5.1.4 OPC Core Components Redistributable

VibroSight 7.x.x (VibroSight 3.x.x or later) requires that the OPC Core Components Redistributable is installed, in order to configure and run VibroSight OPC Clients and VibroSight OPC Servers correctly: the redistributable must be installed on OPC client computers in order to allow connections to remote OPC servers and it must be installed on OPC server computers in order to allow OPC clients to browse for running OPC servers.

NOTE:	The 64-bit version of the OPC Core Components Redistributable ("OPC Core Components Redistributable (x64) 106.0") must be installed on 64-bit Windows computers.
	The 32-bit version of the OPC Core Components Redistributable ("OPC Core Components Redistributable (x86) 106.0") must be installed on 32-bit Windows computers.

If the required OPC Core Components Redistributable is not pre-installed, then the VibroSight installer will detect this and automatically install it as part of the VibroSight software installation.

5.1.5 OPC UA Local Discovery Server

VibroSight 7.x.x or later requires that the OPC UA Local Discovery Server is installed, in order to expose OPC UA servers for discovery and enable communications with OPC UA clients.

If the required OPC UA Local Discovery Server is not pre-installed, then the VibroSight installer will detect this and automatically install it as part of the VibroSight software installation.

5.1.6 Sybase SQL Anywhere 11 software

VibroSight 7.x.x (VibroSight 3.x.x or later) does not include any Sybase SQL database software.

Starting with VibroSight 3.0.0, the VibroSight historical data repositories (VibroSight historical data folder (*.vshdf) for operation with a VibroSight Server (live data) and VibroSight historical data archive (*.vshda) for operation with historical data) are exclusively used for the required data repositories.

A VibroSight database based on Sybase SQL Anywhere (*.vssrvdb) can no longer be used as a data repository. Accordingly, the Sybase SQL Anywhere 11 database software is no longer included and distributed as part of the VibroSight software.

NOTE:	VibroSight 3.x.x or later exclusively uses data repositories based on the VibroSight historical data system.
	VibroSight 2.12.7 used data repositories based on Sybase SQL Anywhere databases and introduced initial support for working with data repositories based on the VibroSight historical data repositories for data analysis.
	VibroSight 2.12.6 or earlier exclusively used data repositories based on Sybase SQL Anywhere databases.

NOTE:	The manual migration of an existing machinery monitoring project to VibroSight 7.x.x (VibroSight 3.x.x or later) is described in detail in the "Data migration" section of the latest *Getting started with VibroSight installation guide*.

5.1.7 Dell Backup and Recovery software

Some Dell™ computers running versions of Dell Backup and Recovery software can experience problems running the VibroSight software, characterised by the VibroSight software not running or running incorrectly. This is because the Dell Backup and Recovery software can use a version of SQLite and associated libraries (DLLs) that prevent the VibroSight Host Service from running correctly.

For example, VibroSight clients can stop running (crash), VibroSight clients can be unable to connect to data sources and/or VibroSight System manager may not display all of the commands expected to be available in the Actions window.

If this behaviour is seen, the recommended workaround is to uninstall the Dell Backup and Recovery software.

NOTE:	It is recommended to install and use VibroSight 3.x.x or earlier on a computer that does not have Dell Backup and Recovery software installed.

5.1.8 MatrikonOPC software

Both MatrikonOPC™ software and the VibroSight software can be installed and run on the same computer.

However, if the MatrikonOPC software is installed after the VibroSight software, this can result in problems related to credentials (access rights). These problems are typically characterised by an unhandled exception in VibroSight Configurator when trying to configure an OPC device in the Hardware view or an unhandled exception in a VibroSight Server when trying to handle/process OPC data.

MatrikonOPC software and the VibroSight software must be installed on the same computer in the following order:

1. Install the MatrikonOPC software.

2. Install the Microsoft Visual C++ Redistributable Package for Visual Studio 2010 (version 40219).
    Note: This redistributable package is required by the MatrikonOPC software.

3. Install the Microsoft Visual C++ Redistributable Package for Visual Studio 2015 (version 23026 or later).
    Note: This redistributable package is required by the VibroSight software.

4. Install VibroSight 3.x.x or later.

5.2 VM600^{Mk2}/VM600 modules/cards

5.2.1 Module/card firmware

There are some firmware upgrades for VM600^{Mk2}/VM600 modules/cards corresponding to VibroSight 7.1.0.

The latest firmware for the VM600^{Mk2} MPC4^{Mk2} module is now:

- Machinery protection: `640-025-006-000.Mpc4g2Fw` (updated)

- Condition monitoring: `640-033-002-000.VxeFw` (updated)

- Recovery: `640-031-003-006.Mpc4g2Fw` (no change)

- Proof test: `640-032-001-001.VxeFw` (no change).

See 2.16 MPC4^{Mk2} + IOC4^{Mk2} module.

The latest firmware for the new VM600^{Mk2} CPUM^{Mk2} module is now:

- Base system: `base-system-640-034-002-001.tgz` (updated).

See 2.17 CPUM^{Mk2} + IOCN^{Mk2} module.

The latest firmware for the VM600 CPUR2 card is now:

- Applications: `applications-640-015-001-006.tgz` (updated)

- Base System : `base-system-640-014-001-006.tgz` (updated).

See 2.18 CPUR2 + IOCR2 module.

The latest firmware for the VM600 CPUR card remains:

- Applications: `applications-640-012-001-005.tgz`

- Base System: `base-system-640-011-001-005.tgz`.

NOTE:	In order to help distinguish between VM600^{Mk2} CPUx modules and VM600 CPUx cards, VibroSight 6.0.0 and later uses the following terminology:
	• **CPUM^{Mk2}** to refer to the VM600^{Mk2} CPUx module with mathematical processing of fieldbus data and support for Modbus TCP and PROFIBUS DP (PNR 600-050).
	• **CPUR2** to refer to the latest version of the VM600 CPUx card with support for PROFIBUS (PNR 600-026-000-VVV).
	• **CPUR** to refer to the earlier version of the VM600 CPUx card with support for Modbus RTU/TCP and card pair redundancy (PNR 600-007-000-VVV).

The latest firmware for the VM600^{Mk2}/VM600 XMC16, XMV16 and XMVS16 cards remains:

- Applications: `applications-640-010-001-016.tgz`

- Base System: `base-system-640-003-001-016.tgz`.

Therefore, for current versions of VibroSight and VM600^{Mk2}/VM600 systems, firmware upgrades are required.

5.3 VibroSmart devices

5.3.1 Module firmware

There are firmware upgrades for VibroSmart modules and devices corresponding to VibroSight 7.1.0.

The latest firmware for the VSI010 module is now:

- `642-002-000-014.xmsifw`

See 2.21 VSI010 + VSB010 module.

The latest firmware for the VSN010 device is now:

- `642-004-000-012.redboxfw`

See 2.19 VSN010 module.

The latest firmware for the VSV30x module is now:

- `642-001-000-020.xtranfw`

See 2.20 VSV301 + VSB300 module.

Therefore, for current versions of VibroSmart modules and devices, firmware upgrades are required.

6 Upgrade procedure

This section describes the procedure for upgrading a VibroSight system from a previous version. Perform the steps in the given sequence in order to complete a system upgrade.

NOTE:	It is strongly recommended to verify the version of firmware running in the related hardware (XMx16 cards and VibroSmart modules and devices) before starting a VibroSight system upgrade, in order to establish if any firmware updates are also required. See 6.2.3 Updating the firmware using VibroSight System Manager.

NOTE:	It is strongly recommended to ensure that a copy of the configuration for a VibroSmart is available before updating the firmware of any of the VibroSmart modules used in the distributed monitoring system. See 6.2.3 Updating the firmware using VibroSight System Manager.

6.1 VibroSight software user settings

The VibroSight Software generates and uses some files on the storage device of the computer running VibroSight to keep track of user-configurable settings, so that these settings are remembered and applied for the VibroSight installation.

These settings files have an .xmssettings file name extension and on a computer running Windows 7, can be found here:

C:\Users*username*\AppData\Roaming\Meggitt\VibroSight, where *username* is the Windows account name.

For example, the VibroSightVision.xmssettings file records the user-configurable default settings for VibroSight Vision, such as default settings for plots.

NOTE:	VibroSight software updates and upgrades do not replace these settings files, so: • For a computer on which VibroSight was previously installed, an update, upgrade or a re-installation of VibroSight will continue to use the previous defaults recorded in the .xmssettings files. • For a computer on which VibroSight was not previously installed, the installation of VibroSight will generate and use new .xmssettings files, which use the latest VibroSight software defaults. If a settings file is deleted for any reason, VibroSight will generate and use a new settings file, which uses the latest VibroSight software defaults.

6.2 Updating VibroSight-compatible hardware

Appropriate files and tools are included in the installation package to allow VM600^{Mk2}/VM600 modules/cards (XMx16) and VibroSmart devices (VSI010, VSN010 and VSV30x) to be updated to the latest firmware, in order to take advantage of improvements to the VibroSight software.

Updating the firmware for VM600^{Mk2}/VM600 modules/cards cards or VibroSmart devices is a special task that can, if used unintentionally or incorrectly, lead to malfunctioning of the device and affect proper function of data acquisition.

During the firmware update of a device, the card or module being updated cannot provide its normal machinery monitoring functions because its outputs (alarms and relays) can go to undetermined states, irrespective of how they have been configured.

For VibroSmart modules, the machinery being monitored is not protected for the duration of a firmware update and the restart (reboot) that is triggered automatically after the firmware update (which can take up to 5 minutes).

NOTE:	It is highly recommended that firmware updates are only performed in accordance with the operating procedures for the machinery being monitored and that appropriate precautions are taken at the control system level (such as DCS or PLC).
	For example, alarms and relay outputs should be ignored (bypassed or inhibited) in order to avoid false trips of the machinery being monitored.

6.2.1 VM600^{Mk2}/VM600 module/card firmware

The latest VM600^{Mk2}/VM600 module/card firmware files are copied to a directory on your computer as part of the VibroSight software installation process.

NOTE:	For example, the default firmware directory for VM600^{Mk2}/VM600 modules/cards is: C:\Program Files\Meggitt\VibroSight\Firmware\VM600

The firmware files for a VM600^{Mk2}/VM600 module/card can be found in the appropriate subfolder and identified by their .tgz file name extension. For example, the XMV16 subfolder contains the applications and base system firmware for use by XMV16 cards. Any additional firmware updates received from Meggitt SA should also be stored in these directories.

Table 1 shows the compatibility between VibroSight software and VM600^{Mk2} MPC4^{Mk2} module hardware (that is, MPC4^{Mk2} firmware).

Table 2 shows the compatibility between VibroSight software and VM600^{Mk2} CPUM^{Mk2} module hardware (that is, CPUM^{Mk2} firmware).

Table 3 shows the compatibility between VibroSight software and VM600 CPUR2 card hardware (that is, CPUR2 firmware).

Table 4 shows the compatibility between VibroSight software and VM600 CPUR card hardware (that is, CPUR firmware).

Table 5 shows the compatibility between VibroSight software and VM600 XMx16 card hardware (that is, XMC16, XMV16 and XMVS16 firmware).

NOTE:	It is strongly recommended to use the most recent version of the VM600 CPUR firmware and VM600 XMx16 firmware that is compatible with the version of VibroSight software being used.

Table 1: VibroSight software and VM600^{Mk2} MPC4^{Mk2} firmware compatibility

VibroSight software version — Part number (PNR)	VM600^{Mk2} MPC4^{Mk2} firmware				
	Machinery protection firmware (`640-025-vvv-ppp.Mpc4g2Fw`)				
	`640-025-003-002`	`640-025-004-000`	`640-025-004-003`	`640-025-005-000`	`640-025-006-000`
	Condition monitoring firmware (`640-033-vvv-ppp.VxeFw`)				
	---	---	---	`640-033-001-000`	`640-033-002-000`
	Recovery firmware (`640-031-vvv-ppp.Mpc4g2Fw`)				
	`640-031-003-002`	`640-031-003-004`	`640-031-003-006`		
	Proof test firmware (`640-032-vvv-ppp.VxeFw`)				
	`640-032-001-000`		`640-032-001-001`		
6.0.0 609-004-000-050	✓ See note 1				
6.1.0 609-004-000-051		✓ See note 2			
7.0.0 609-010-000-001			✓ See note 3a	✓ See note 3b	
7.1.0 609-010-000-001					✓ See note 4

Notes for Table 1 (see the next page)

Notes for Table 1

1. This version of VM600^{Mk2} MPC4^{Mk2} (previously referred to as VM600 MPC4G2) firmware is the official launch release of firmware supporting VibroSight Protect and VM600^{Mk2} systems. A firmware upgrade is required in order to run VibroSight 6.0.0 or later – that is, to use VM600^{Mk2} systems in "live" machinery protection system (MPS) applications. Contact Meggitt SA for further information.

2. This version of VM600^{Mk2} MPC4^{Mk2} firmware improves frequency domain measurements (the phase component can be used as the input signal for an analog output), differential expansion (dual taper) processing (the ramp angles for the taper on the shaft are configured separately), auxiliary input channels configured as tacho inputs (appropriate data quality indicators and warning messages, with automatic recovery), and the maximum tacho speed / frequency has been increased. It also includes a number of bug fixes. (Refer to the VibroSight 6.1 release notes for further information.) A firmware upgrade is required in order to run VibroSight 6.1.0 or later.

3a. These versions of VM600^{Mk2} MPC4^{Mk2} firmware:
• Improve support for machinery protection with 640-025-004-003 machinery protection firmware running on earlier versions of hardware only (MPC4^{Mk2} modules with PNR 600-041-000-001).
• No support for condition monitoring on earlier versions of hardware (MPC4^{Mk2} modules with PNR 600-041-000-001).
• Improve system recovery (640-031-003-006 recovery firmware).
• Improve proof testing (640-032-001-001 proof test firmware).
For further information on these versions of VM600^{Mk2} MPC4^{Mk2} firmware, refer to the VibroSight 7.0 release notes.
A firmware upgrade is required in order to run VibroSight 7.0.0 or later.

3b. These versions of VM600^{Mk2} MPC4^{Mk2} firmware:
• Improve support for machinery protection with 640-025-005-000 machinery protection firmware running on later versions of hardware only (MPC4^{Mk2} modules with PNR 600-041-000-002).
• Add support for condition monitoring with 640-033-001-000 condition monitoring firmware running on later versions of hardware only (MPC4^{Mk2} modules with PNR 600-041-000-002).
• Improve system recovery (640-031-003-006 recovery firmware).
• Improve proof testing (640-032-001-001 proof test firmware).
For further information on these versions of VM600^{Mk2} MPC4^{Mk2} firmware, refer to the VibroSight 7.0 release notes.
A firmware upgrade is required in order to run VibroSight 7.0.0 or later.

4. These versions of VM600^{Mk2} MPC4^{Mk2} firmware:
• Improve support for machinery protection with 640-025-006-000 machinery protection firmware running on later versions of hardware only (MPC4^{Mk2} modules with PNR 600-041-000-002).
• Improve support for condition monitoring with 640-033-002-000 condition monitoring firmware running on later versions of hardware only (MPC4^{Mk2} modules with PNR 600-041-000-002).
See 2.16 MPC4Mk2 + IOC4Mk2 module for further information. A firmware upgrade is required in order to run VibroSight 7.1.0 or later.

Table 2: VibroSight software and VM600^{Mk2} CPUM^{Mk2} firmware compatibility

| VibroSight software version | VM600^{Mk2} CPUM^{Mk2} firmware See note 1 | | |
Part number (PNR)	Base-system / Applications firmware (`*.tgz`)		
	`640-034-001-000`	`640-034-001-001`	`640-034-002-00`
6.1.0 609-004-000-051	✓ See note 2		
7.0.0 609-010-000-001		✓ See note 3	
7.1.0 609-010-000-001			✓ See note 4

Notes for Table 2

1. VM600 CPUR2 firmware is packaged and distributed as a *.tgz* file (a compressed archive file format) with PNRs such as *640-034-001-xxx* for the base system firmware. In these PNRs, the *xxx-xxx-001-xxx* denotes the firmware is packaged in the tgz file format.

After the *.tgz* file is unpacked by VibroSight System Manager and the firmware is uploaded to a VM600 CPUM^{Mk2} module, the dialog box displayed by the VibroSight System Manager's Change Firmware command shows the current version of firmware using PNRs such as *640-034-000-xxx* for the base system firmware, which correspond to the actual unpacked firmware that is running on the module.

2. This version of VM600^{Mk2} CPUM^{Mk2} firmware is the official launch release of firmware supporting VM600^{Mk2} systems. (Refer to the VibroSight 6.1 release notes for further information.) A firmware upgrade is required in order to run VibroSight 6.1.0 or later.

3. For information on this version of VM600^{Mk2} CPUM^{Mk2} firmware, refer to the VibroSight 7.0 release notes.
A firmware upgrade is required in order to run VibroSight 7.0.0 or later.

4. For information on this version of VM600^{Mk2} CPUM^{Mk2} firmware, see 2.17 CPUMMk2 + IOCNMk2 module.
A firmware upgrade is required in order to run VibroSight 7.1.0 or later.

Table 3: VibroSight software and VM600 CPUR2 firmware compatibility

VibroSight software version Part number (PNR)	VM600 CPUR2 firmware See note 1				
	Base-system firmware (`*.tgz`)				
	640-014-001-001	640-014-001-002	640-014-001-003	640-014-001-005	640-014-001-006
	Applications firmware (`*.tgz`)				
	640-015-001-001	640-015-001-002	640-015-001-003	640-015-001-005	640-015-001-006
3.5.0 609-004-000-042	✔ See note 2	✔ See note 3	✔		
3.6.0 609-004-000-043	✔	✔	✔		
3.7.0 609-004-000-044	✔	✔	✔		
3.8.0 609-004-000-045	✔	✔	✔		
4.0.0 609-004-000-046	✔	✔	✔		
4.1.0 609-004-000-047	✔	✔	✔ See note 4		
5.0.0 609-004-000-048	✔	✔	✔		
5.1.0 609-004-000-049	✔	✔	✔		
6.0.0 609-004-000-050	✔	✔	✔		
6.1.0 609-004-000-051	✔	✔	✔		
7.0.0 609-010-000-001				✔ See note 5	
7.1.0 609-010-000-001					✔ See note 6

Notes for Table 3 (see the next page)

Notes for Table 3

1. VM600 CPUR2 firmware is packaged and distributed as a *.tgz* file (a compressed archive file format) with PNRs such as *640-014-001-xxx* for the Base System and *640-015-001-xxx* for the (Applications) Firmware. In these PNRs, the *xxx-xxx-001-xxx* denotes the firmware is packaged in the tgz file format.

After the *.tgz* file is unpacked by VibroSight System Manager and the firmware is uploaded to a VM600 CPUR2 card, the dialog box displayed by the VibroSight System Manager's Change Firmware command shows the current version of firmware using PNRs such as *640-014-000-xxx* for the Base System and *640-015-000-xxx* for the Firmware, which correspond to the actual unpacked firmware that is running on the card.

2. This is the first official release of VM600 CPUR2 firmware and includes features such as the management of XMx16 card configurations for applications such as control systems and the implementation of the PROFIBUS protocol for the fieldbus interfaces. A firmware upgrade is required in order to run VibroSight 2.12.7 or later.

3. This version of VM600 CPUR2 firmware includes improvements such as changing the PROFIBUS polling rate for the Modbus server to 100 ms (was 200 ms) and a bug fix for a known VM600 CPUx time counter wraparound (overflow) issue. A firmware upgrade is strongly recommended in order to run VibroSight 3.4.0 or later.

4. This version of VM600 CPUR2 firmware includes improvements such as overall performance, responsiveness and stability, and support for CPUR2/IOCR2 card pair relays, and the ability to download the GSD file directly from the card. A firmware upgrade is strongly recommended but is not required in order to run VibroSight 4.1.0 or later.
Note: VibroSight 4.1.0 or later must be used in order to download the VM600 CPUR2 GSD file directly from the CPUR2 card.

5. For information on this version of VM600^{Mk2} CPUR2 firmware, refer to the VibroSight 7.0 release notes.
A firmware upgrade is required in order to run VibroSight 7.0.0 or later.

6. For information on this version of VM600^{Mk2} CPUR2 firmware, see 2.18 CPUR2 + IOCR2 module.
A firmware upgrade is required in order to run VibroSight 7.1.0 or later.

Table 4: VibroSight software and VM600 CPUR firmware compatibility

VibroSight software version Part number (PNR)	VM600 CPUR firmware See note 1	
	Base-system firmware (`*.tgz`)	
	`640-011-001-004`	`640-011-001-005`
	Applications firmware (`*.tgz`)	
	`640-012-001-004`	`640-012-001-005`
4.0.0 609-004-000-046	✔ See note 2	✔
4.1.0 609-004-000-047	✔	✔ See note 3
5.0.0 609-004-000-048	✔	✔
5.1.0 609-004-000-049	✔	✔
6.0.0 609-004-000-050	✔	✔
6.1.0 609-004-000-051	✔	✔
7.0.0 609-010-000-001	✔	✔
7.1.0 609-010-000-001	✔	✔

Notes for Table 4

1. VM600 CPUR firmware is packaged and distributed as a *.tgz* file (a compressed archive file format) with PNRs such as *640-011-001-xxx* for the Base System and *640-012-001-xxx* for the (Applications) Firmware. In these PNRs, the *xxx-xxx-001-xxx* denotes the firmware is packaged in the tgz file format.

After the *.tgz* file is unpacked by VibroSight System Manager and the firmware is uploaded to a VM600 CPUR card, the dialog box displayed by the VibroSight System Manager's Change Firmware command shows the current version of firmware using PNRs such as *640-011-000-xxx* for the Base System and *640-012-000-xxx* for the Firmware, which correspond to the actual unpacked firmware that is running on the card.

2. This is the latest official release of VM600 CPUR firmware (that is, the earlier version of the CPUx card with support for card pair redundancy (PNR 600-007-000-VVV)), which was discontinued in VibroSight 2.12.0 and reintroduced in VibroSight 4.0.x).

3. This version of VM600 CPUR firmware includes a bug fix for a known VM600 CPUx time counter wraparound (overflow) issue and the addition of relay outputs to the diagnostics logs. A firmware upgrade is strongly recommended but is not required in order to run VibroSight 4.1.0 or later.

Table 5: VibroSight software and VM600 XMx16 firmware compatibility

VibroSight software version Part number (PNR)	VM600 XMx16 firmware See note 1
	Base-system firmware (`*.tgz`)
	`640-003-001-016`
	Applications firmware (`*.tgz`)
	`640-010-001-016`
3.4.0 609-004-000-041	✔ See note 2
3.5.0 609-004-000-042	✔
3.6.0 609-004-000-043	✔
3.7.0 609-004-000-044	✔
3.8.0 609-004-000-045	✔
4.0.0 609-004-000-046	✔
4.1.0 609-004-000-047	✔
5.0.0 609-004-000-048	✔
5.1.0 609-004-000-049	✔
6.0.0 609-004-000-050	✔
6.1.0 609-004-000-051	✔
7.0.0 609-010-000-001	✔
7.1.0 609-010-000-001	✔

Notes for Table 5 (see the next page)

Notes for Table 5

1. VM600 XMx16 firmware is packaged and distributed as a *.tgz* file (a compressed archive file format) with PNRs such as *640-003-001-xxx* for the Base System and *640-010-001-xxx* for the (Applications) Firmware. In these PNRs, the *xxx-xxx-001-xxx* denotes the firmware is packaged in the tgz file format.

After the *.tgz* file is unpacked by VibroSight System Manager and the firmware is uploaded to a VM600 XMx16 card, the dialog box displayed by the VibroSight System Manager's Change Firmware command shows the current version of firmware using PNRs such as *640-010-000-xxx* for the Firmware and *640-003-000-xxx* for the Base System, which correspond to the actual unpacked firmware that is running on the card.

2. This version of VM600 XMx16 firmware includes relaxed constraints for dynamic data retention time, that is, optimised memory to reduce the possibility of missing data in data intensive VibroSight applications running on less powerful computers. A firmware upgrade is required in order to run VibroSight 3.3.0 or later.

6.2.2   VibroSmart device firmware

The latest VibroSmart device firmware files are copied to a directory on your computer as part of the VibroSight software installation process.

NOTE:	The default firmware directory for VibroSmart devices is: C:\Program Files\Meggitt\VibroSight\Firmware\VibroSmart

The firmware files for a VibroSmart device can be found in the appropriate subfolder and identified by their `.*fw` file name extension. For example, the VSV30x subfolder contains the firmware for use by VSV30x modules. Any additional firmware updates received from Meggitt SA should also be stored in these directories.

Table 6 shows the compatibility between VibroSight software and the VibroSmart VSI010 firmware.

Table 7 shows the compatibility between VibroSight software and the VibroSmart VSN010 firmware.

Table 8 shows the compatibility between VibroSight software and the VibroSmart VSV30x firmware.

NOTE:	It is strongly recommended to use the most recent version of the VibroSmart firmware that is compatible with the version of VibroSight software being used.

Table 6: VibroSight software and VibroSmart VSI010 firmware compatibility

VibroSight software version Part number (PNR)	VSI010 firmware (`*.xmsifw`) See note 1				
	`642-002-000-010`	`642-002-000-011`	`642-002-000-012`	`642-002-000-013`	`642-002-000-014`
5.0.0 609-004-000-048	✔ See notes 2 and 3	✔ See notes 2 and 4	✔ See notes 2 and 5		
5.1.0 609-004-000-049	✔	✔	✔		
6.0.0 609-004-000-050	✔	✔	✔		
6.1.0 609-004-000-051				✔ See notes 2 and 6	
7.0.0 609-010-000-001				✔	
7.1.0 609-010-000-001					✔ See notes 2 and 7

Notes for Table 6 (see the next page)

Notes for Table 6

1. VibroSmart VSI010 firmware is distributed as a single *.xmsifw* file (a proprietary file format) with a PNR such as *642-xxx-000-xxx*. In these PNRs, the *xxx-xxx-000-xxx* denotes that the firmware is not packaged (compressed or archived). VibroSight System Manager always uses and displays information about VibroSmart device firmware using PNRs such as *642-xxx-000-xxx*, which correspond to the actual firmware that is running on the device.

2. Updating to this version of VibroSmart VSI010 firmware requires a specific process:

Notes: For a VibroSmart consisting of different types of device, the devices should be updated in the following order: first VSN010 real-time Ethernet switches, then VSV30x vibration monitoring modules and finally VSI010 communications interface modules. In addition, VibroSight System Manager should be exited (closed) and restarted after updating the firmware for each type of device, before continuing. And after updating the firmware, the configuration on the VibroSmart devices should be re-applied (re-activated) and the VibroSmart devices should be restarted.

Procedure:

(1) Ensure that a copy of the configuration for the VibroSmart is available before updating any device firmware. For example, using the currently installed version of VibroSight (that is, before any updates to the VibroSight software corresponding to updates to VibroSmart devices), VibroSight Configurator can be used to obtain a copy of the configuration as follows:
• For a VibroSmart using a VibroSight Server, the **File > Open > Server / Database** command can be used to read the configuration from the VibroSight Server.
• For a VibroSmart not using a VibroSight Server (that is, a "stand-alone" VibroSmart), the **File > Open > Device** command can be used to read the configuration directly from the VibroSmart modules.
Then the **File > Save As > File** command can be used to store a copy of the configuration for the VibroSmart.

(2) Start VibroSight System Manager, select the device or devices of the same type to be updated (for example, VSI010 modules) and run the Change Firmware command.
When updating multiple VibroSmart devices of the same type to use the same firmware, CTRL+click or SHIFT+click can be used to select multiple devices in the Devices tree structure of the System Explorer window. This way, when the Change Firmware command is run, all of devices that were selected will be updated at the same time. Otherwise, each device must be selected and updated individually.

(3) When the VibroSmart Module(s) Firmware Upgrade window displays a "Firmware upgrade terminated. The firmware has been upgraded successfully …" message, click the **Finish** button to continue.
If after 10 minutes, the VibroSmart Module(s) Firmware Upgrade window does not display a successful message, click the **Cancel** button to close the window and continue.
Then exit (close) VibroSight System Manager.

(4) Restart VibroSight System Manager and verify that the correct version of firmware is reported for each device that was updated. (When a device is selected in the System Explorer window, this information is available in the main window (centre) under Module PNR. It is also available in the VibroSmart Module(s) Firmware Upgrade window when a device is selected and the Change Firmware command is run).
If a device does not report the correct version of firmware, rerun the Change Firmware command for this device.
Then exit (close) VibroSight System Manager.

(5) Repeat steps (2), (3) and (4) for each type of device to be updated (for example, VSN010 and VSV30x modules).

(6) Start VibroSight Configurator, open the configuration for the VibroSmart (see step (1)), then apply (activate) the configuration. (If required, VibroSight Configurator will automatically update the configuration to the latest version and inform the user.)
Then exit (close) VibroSight Configurator.

(7) Turn the power supply to the VibroSmart off and wait for a few seconds. Then turn the power supply back on and verify that the system operates as expected.

During this firmware update process, the behaviour of the LEDs on the front panel of the VibroSmart devices can be inconsistent and should be ignored. Normal LED behaviour resumes after the firmware update is complete (after step (7)).

3. This version of VibroSmart VSI010 firmware has no limit on the number of constants per VSI010 module.
A firmware upgrade is recommended but is not required in order to run VibroSight 3.8.0 or later.

4. This version of VibroSmart VSI010 firmware adds support for Modbus function code 03.
A firmware upgrade is required in order to run VibroSight 5.0.0 or later.

5. This version of VibroSmart VSI010 firmware adds support for module lock and the GOOSE communications protocol (IEC 61850).
A firmware upgrade is required in order to run VibroSight 5.0.0 or later.

6. For information on this version of VibroSmart VSI010 firmware, refer to the VibroSight 6.1 release notes.
A firmware upgrade is required in order to run VibroSight 6.1.0 or later.

7. For information on this version of VibroSmart VSI010 firmware, see 2.21 VSI010 + VSB010 module.
A firmware upgrade is required in order to run VibroSight 7.1.0 or later.

Table 7: VibroSight software and VibroSmart VSN010 firmware compatibility

VibroSight software version Part number (PNR)	VSN010 firmware (`*.redboxfw`) See note 1	
	`642-004-000-011`	`642-004-000-012`
5.0.0 609-004-000-048	✓ See note 2	
5.1.0 609-004-000-049	✓	
6.0.0 609-004-000-050	✓	
6.1.0 609-004-000-051	✓	
7.0.0 609-010-000-001	✓	
7.1.0 609-010-000-001		✓ See notes 2 and 3

Notes for Table 7 (see the next page)

Notes for Table 7

1. VibroSmart VSN010 firmware is distributed as a single *.redboxfw* file (a proprietary file format) with a PNR such as *642-xxx-000-xxx*. In these PNRs, the *xxx-xxx-000-xxx* denotes that the firmware is not packaged (compressed or archived). VibroSight System Manager always uses and displays information about VibroSmart device firmware using PNRs such as *642-xxx-000-xxx*, which correspond to the actual firmware that is running on the device.

2. Updating to this version of VibroSmart VSN010 firmware requires a specific process:

Notes: For a VibroSmart consisting of different types of device, the devices should be updated in the following order: first VSN010 real-time Ethernet switches, then VSV30x vibration monitoring modules and finally VSI010 communications interface modules. In addition, VibroSight System Manager should be exited (closed) and restarted after updating the firmware for each type of device, before continuing. And after updating the firmware, the configuration on the VibroSmart devices should be re-applied (re-activated) and the VibroSmart devices should be restarted.

Procedure:

(1) Ensure that a copy of the configuration for the VibroSmart is available before updating any device firmware. For example, using the currently installed version of VibroSight (that is, before any updates to the VibroSight software corresponding to updates to VibroSmart devices), VibroSight Configurator can be used to obtain a copy of the configuration as follows:
• For a VibroSmart using a VibroSight Server, the **File > Open > Server / Database** command can be used to read the configuration from the VibroSight Server.
• For a VibroSmart not using a VibroSight Server (that is, a "stand-alone" VibroSmart), the **File > Open > Device** command can be used to read the configuration directly from the VibroSmart modules.
Then the **File > Save As > File** command can be used to store a copy of the configuration for the VibroSmart.

 (2) Start VibroSight System Manager, select the device or devices of the same type to be updated (for example, VSN010 modules) and run the Change Firmware command.
When updating multiple VibroSmart devices of the same type to use the same firmware, CTRL+click or SHIFT+click can be used to select multiple devices in the Devices tree structure of the System Explorer window. This way, when the Change Firmware command is run, all of devices that were selected will be updated at the same time. Otherwise, each device must be selected and updated individually.

(3) When the VibroSmart Module(s) Firmware Upgrade window displays a "Firmware upgrade terminated. The firmware has been upgraded successfully …" message, click the **Finish** button to continue.
If after 10 minutes, the VibroSmart Module(s) Firmware Upgrade window does not display a successful message, click the **Cancel** button to close the window and continue.
Then exit (close) VibroSight System Manager.

(4) Restart VibroSight System Manager and verify that the correct version of firmware is reported for each device that was updated. (When a device is selected in the System Explorer window, this information is available in the main window (centre) under Module PNR. It is also available in the VibroSmart Module(s) Firmware Upgrade window when a device is selected and the Change Firmware command is run).
If a device does not report the correct version of firmware, rerun the Change Firmware command for this device.
Then exit (close) VibroSight System Manager.

(5) Repeat steps (2), (3) and (4) for each type of device to be updated (for example, VSI010 and VSV30x modules).

(6) Start VibroSight Configurator, open the configuration for the VibroSmart (see step (1)), then apply (activate) the configuration. (If required, VibroSight Configurator will automatically update the configuration to the latest version and inform the user.)
Then exit (close) VibroSight Configurator.

(7) Turn the power supply to the VibroSmart off and wait for a few seconds. Then turn the power supply back on and verify that the system operates as expected.

During this firmware update process, the behaviour of the LEDs on the front panel of the VibroSmart devices can be inconsistent and should be ignored. Normal LED behaviour resumes after the firmware update is complete (after step (7)).

3. For information on this version of VibroSmart VSN010 firmware, see 2.19 VSN010 module.
A firmware upgrade is required in order to run VibroSight 7.1.0 or later.

Table 8: VibroSight software and VibroSmart VSV30x firmware compatibility

VibroSight software version Part number (PNR)	VSV30x firmware (*.xtranfw) See note 1				
	642-001-000-017	642-001-000-018	642-001-000-000DEV_ SVN14937_ 2020-05-20	642-001-000-019	642-001-000-020
5.0.0 609-004-000-048	✔ See notes 2 and 3	✔ See notes 2 and 4			
5.1.0 609-004-000-049	✔	✔	✔ See notes 2 and 5		
6.0.0 609-004-000-050	✔	✔	✔		
6.1.0 609-004-000-051				✔ See notes 2 and 6	
7.0.0 609-010-000-001				✔	
7.1.0 609-010-000-001					✔ See notes 2 and 7

Notes for Table 8 (see the next page)

Notes for Table 8

1. VibroSmart VSV30x firmware is distributed as a single *.xtranfw* file (a proprietary file format) with a PNR such as *642-xxx-000-xxx*. In these PNRs, the *xxx-xxx-000-xxx* denotes that the firmware is not packaged (compressed or archived). VibroSight System Manager always uses and displays information about VibroSmart device firmware using PNRs such as *642-xxx-000-xxx*, which correspond to the actual firmware that is running on the device.

2. Updating to this version of VibroSmart VSV30x firmware requires a specific process:

Notes: For a VibroSmart consisting of different types of device, the devices should be updated in the following order: first VSN010 real-time Ethernet switches, then VSV30x vibration monitoring modules and finally VSI010 communications interface modules. In addition, VibroSight System Manager should be exited (closed) and restarted after updating the firmware for each type of device, before continuing. And after updating the firmware, the configuration on the VibroSmart devices should be re-applied (re-activated) and the VibroSmart devices should be restarted.

Procedure:

(1) Ensure that a copy of the configuration for the VibroSmart is available before updating any device firmware. For example, using the currently installed version of VibroSight (that is, before any updates to the VibroSight software corresponding to updates to VibroSmart devices), VibroSight Configurator can be used to obtain a copy of the configuration as follows:
• For a VibroSmart using a VibroSight Server, the **File > Open > Server / Database** command can be used to read the configuration from the VibroSight Server.
• For a VibroSmart not using a VibroSight Server (that is, a "stand-alone" VibroSmart), the **File > Open > Device** command can be used to read the configuration directly from the VibroSmart modules.
Then the **File > Save As > File** command can be used to store a copy of the configuration for the VibroSmart.
(2) Start VibroSight System Manager, select the device or devices of the same type to be updated (for example, VSV30x modules) and run the Change Firmware command.
When updating multiple VibroSmart devices of the same type to use the same firmware, CTRL+click or SHIFT+click can be used to select multiple devices in the Devices tree structure of the System Explorer window. This way, when the Change Firmware command is run, all of devices that were selected will be updated at the same time. Otherwise, each device must be selected and updated individually.
(3) When the VibroSmart Module(s) Firmware Upgrade window displays a "Firmware upgrade terminated. The firmware has been upgraded successfully …" message, click the **Finish** button to continue.
If after 10 minutes, the VibroSmart Module(s) Firmware Upgrade window does not display a successful message, click the **Cancel** button to close the window and continue.
Then exit (close) VibroSight System Manager.
(4) Restart VibroSight System Manager and verify that the correct version of firmware is reported for each device that was updated. (When a device is selected in the System Explorer window, this information is available in the main window (centre) under Module PNR. It is also available in the VibroSmart Module(s) Firmware Upgrade window when a device is selected and the Change Firmware command is run).
If a device does not report the correct version of firmware, rerun the Change Firmware command for this device.
Then exit (close) VibroSight System Manager.
(5) Repeat steps (2), (3) and (4) for each type of device to be updated (for example, VSI010 and VSN010 modules).
(6) Start VibroSight Configurator, open the configuration for the VibroSmart (see step (1)), then apply (activate) the configuration. (If required, VibroSight Configurator will automatically update the configuration to the latest version and inform the user.)
Then exit (close) VibroSight Configurator.
(7) Turn the power supply to the VibroSmart off and wait for a few seconds. Then turn the power supply back on and verify that the system operates as expected.
During this firmware update process, the behaviour of the LEDs on the front panel of the VibroSmart devices can be inconsistent and should be ignored. Normal LED behaviour resumes after the firmware update is complete (after step (7)).

3. This version of VibroSmart VSV30x firmware adds support for configurable tacho ratios, flexible input channel to processing block mapping, and up to two tacho processing blocks. A firmware upgrade is required in order to run VibroSight 5.0.0 or later.

4. This version of VibroSmart VSV30x firmware adds support for module lock, PTP (precision time protocol) time synchronisation, channel bypass and pre-trigger data logging. A firmware upgrade is required in order to run VibroSight 5.0.0 or later.

5. This version of VibroSmart VSV30x firmware improves support for hydro air-gap and magnetic-flux monitoring with a minor bug fix.
A firmware upgrade is required in order to run VibroSight 5.1.0 or later.

6. For information on this version of VibroSmart VSV30x firmware, refer to the VibroSight 6.1 release notes.
A firmware upgrade is required in order to run VibroSight 6.1.0 or later.

7. For information on this version of VibroSmart VSV30x firmware, see 2.20 VSV301 + VSB300 module.
A firmware upgrade is required in order to run VibroSight 7.1.0 or later.

6.2.3   Updating the firmware using VibroSight System Manager

When performing VibroSight software upgrades, it is strongly recommended to systematically upgrade the firmware of VM600 XMx16 cards and VibroSmart devices to the latest compatible version.

Failure to perform a necessary VibroSight-compatible VM600^{Mk2}/VM600 module/card firmware update may lead to incoherent system behaviour and affect the proper functioning of data acquisition in a system. It is only in systems where the firmware running on the XMx16 cards and VibroSmart devices already corresponds to the latest available version that no firmware update is required. Therefore, it is strongly recommended to verify the version of firmware running on the hardware before starting a VibroSight system upgrade, in order to establish if a firmware update is also required.

NOTE:	Changing the firmware of the VibroSight hardware is a special administrative task that can – if performed unintentionally – affect the proper functioning of data acquisition in a system.
	It is therefore strongly recommended to change the firmware of the VibroSight hardware only when it is necessary. For example, when the devices must be updated to be compatible with a VibroSight software upgrade.

For VibroSmart modules, each module can be selected and its firmware updated individually. Alternatively, multiple modules of the same type (for example, VSV3x0) can be updated to the same version of firmware at the same time.

NOTE:	It is strongly recommended to ensure that a copy of the configuration for a VibroSmart is available before updating the firmware of any of the VibroSmart modules used in the distributed monitoring system.
	For example, using the currently installed version of VibroSight (that is, before any updates to the VibroSight software corresponding to updates to VibroSmart modules), VibroSight Configurator should be used to obtain a copy of the configuration as follows:
	For a VibroSmart using a VibroSight Server, the **File > Open > Server / Database** command can be used to read the configuration from the VibroSight Server.
	For a VibroSmart not using a VibroSight Server (that is, a "stand-alone" VibroSmart), the **File > Open > Device** command can be used to read the configuration directly from the VibroSmart modules.
	Then the **File > Save As > File** command should be used to store a copy of the configuration for the VibroSmart distributed monitoring system.

Update the firmware on a VibroSight device using the 💾 **Change Firmware** tool (from VibroSight System Manager's **Maintenance** tools):

1. Ensure that the computer running the VibroSight software is on the same network as the hardware (XMx16 card or VibroSmart module or device) to be updated.

2. Start VibroSight System Manager and navigate to the Devices tree structure in the System Explorer window.

The Devices tree lists all of the VibroSight compatible hardware that VibroSight can see on the network. If there are no XMx16 cards or VibroSmart devices in the tree structure or some cards are missing, verify your network connections.

3. Select the card or device that requires its firmware to be changed.

The Actions tool window updates to show the available tools.

To change multiple VibroSmart to use the same version of firmware at the same time, use CTRL+click or SHIFT+click to select multiple devices from the Devices tree-view. (Then, when the Change Firmware command is run, all of the devices that were selected will be updated at the same time.)

4. Click ![icon] **Change Firmware** in the Maintenance tools group of the Actions window.

The Change Firmware dialog box appears.

5. Click the **Add** button and select the new firmware files for the card or new firmware file for the device.

NOTE:	The Change Firmware dialog box automatically opens the firmware folder corresponding to the VibroSight-compatible VM600^{Mk2}/VM600 module/card or VibroSmart device selected.
	In general, .tgz files are for VM600^{Mk2}/VM600 modules/cards and .*fw files are for VibroSmart devices.

6. Click the **Finish** button to start the firmware upgrade process.

For XMx16 cards and VibroSmart devices, the firmware upgrade process can take up to 5 minutes, during which:

- The IP address beside the device's serial number in the Devices tree structure can disappear.

- The LEDs on the front panel of the device can change to reflect the status of the upgrade.

7. Repeat steps 3 to 6 for each device that requires a firmware update.

NOTE:	Although the firmware for each VibroSight device must be changed individually using the ![icon] **Change Firmware** tool, as each device updates its firmware independently of the VibroSight software (once the process has started), firmware updates can be performed on several devices in parallel.

8. After the firmware upgrade, verify that the VibroSight system is acquiring data from the cards.

NOTE:	Refer also to the *Changing the firmware* topics in the ![icon] *VibroSight* help.

The ![floppy disk icon] **Change Firmware** tool can be used to load a VibroSight device with any version of firmware. It is therefore possible to change a device's firmware to any previously available version, as well as the latest update.

This feature can be useful in certain situations, for example, swapping spare VibroSight hardware between different VM600 racks or VibroSmart distributed monitoring systems, where systems are operating with different versions of VibroSight.

6.3 Final checks

After upgrading the VibroSight software, it is recommended to check that VibroSight has not been inadvertently modified and that it continues to operate normally.

In particular, it is recommended to check any VibroSight Servers in order to ensure that the data acquisition and external interfaces, data post-processing and/or logging are all configured as expected.

In a VibroSight Server user interface:

- On the Status tab under Device drivers, check that the VM600, VibroSmart, OPC and Modbus controls are enabled or disabled as required by your application.

- On the Status tab under Server features, check that the Basic math, Air gap, Combustion monitoring, Duration counters, VSHDA import and Data logging manager controls are enabled or disabled as required by your application.

- On the Log messages tab, check the listed messages (Info level) to ensure that the hardware (VM600^{Mk2}/VM600 modules/cards and /or VibroSmart modules) have been discovered and that data acquisition has resumed.

NOTE:	When a VibroSight Server is running as a Windows service, the usual VibroSight Server user interface is not displayed, so VibroSight System Manager must be used to work with the VibroSight Server.
	That is, VibroSight System Manager can be used to connect to a VibroSight Server in order to check and configure the operation of the server's drivers and features.

Finally, after an upgrade, it is strongly recommended to use VibroSight Vision to connect to any VibroSight Servers in order to verify that new live and/or historical data is available.

7   Customer support

7.1 Contacting us

Meggitt SA worldwide customer support network offers a range of support including Technical support and Sales and repairs support. For customer support, please contact your local Meggitt representative. Alternatively, contact our main office:

<div align="center">

Customer support
Meggitt SA
Route de Moncor 4
Case postale
1701 Fribourg
Switzerland

Telephone: +41 (0) 26 407 11 11
Email: energysupport@ch.meggitt.com
Website: www.meggittsensing.com/energy

</div>

7.2 Technical support

Meggitt SA technical support team provide both pre-sales and post-sales technical support, including:

- General advice
- Technical advice
- Troubleshooting
- Site visits.

7.3 Sales and repairs support

Meggitt SA sales team provide both pre-sales and post-sales support, including advice on:

- New products
- Spare parts
- Repairs.

Appendix

VibroSight software and Windows® operating system compatibility

	Windows 11	Windows 10	Windows 8.1
VibroSight software compatible?	Yes	Yes	Yes but not recommended for new installations as Microsoft mainstream support ended in 2018 (extended support will end in 2023)

VibroSight software and Windows® Server operating system compatibility

	Windows Server 2022	Windows Server 2016	Windows Server 2012
VibroSight software compatible?	Yes	Yes	Yes but not recommended for new installations as Microsoft mainstream support ended in 2018 (extended support will end in 2023)

VibroSight software and Microsoft® .NET Framework requirements

VibroSight software version	Microsoft .NET Framework requirements
VibroSight 3.7.0 or later	.NET Framework 4.7.2 See note 1
VibroSight 3.4.0 or later	.NET Framework 4.7.1 See note 2
VibroSight 3.0.0 or later	.NET Framework 4.6
VibroSight 2.12.0 or later	.NET Framework 4.5 and .NET Framework 2.0 See note 3
VibroSight 2.9.4 or later	.NET Framework 4.5
VibroSight 2.9.3 and 2.9.2	.NET Framework 4 (Standalone Installer)
VibroSight 2.9.1 or earlier	.NET Framework 3.5 SP1

Notes

1. Microsoft .NET Framework 4.7.2 replaces .NET Framework versions 4.0 to 4.7.1.

2. Microsoft .NET Framework 4.7.1 replaces .NET Framework versions 4.0 to 4.7.

3. Since Microsoft .NET Framework 3.5 also includes .NET Framework 2.0 and .NET Framework 3.0, installing Microsoft .NET Framework 3.5 SP1 is the recommended solution for most computers (rather than installing Microsoft .NET Framework 2.0).