SOFTWARE RELEASE NOTES

vibro–meter®

VibroSight® software version 7.8

VibroSight
Machinery Protection &
Condition Monitoring
Software

REVISION RECORD SHEET

SW version / RN edition	Date of issue	Written and modified by	Description	Signature
7.8.0 / 1	22.09.2025	Peter Ward	This document corresponds to VibroSight version 7.8.0. Please refer to section 3 Functional safety for important information about using the SIL safety versions of VM600^{Mk2} modules in a safety-related application (functional safety context), specifically: • VM600^{Mk2} MPC4 ^{Mk2} + IOC4 ^{Mk2} SIL machinery protection and condition monitoring module. • VM600 ^{Mk2} RLC16 ^{Mk2} SIL relay module.	PW

	Department	Name	Date	Signature
Technical content approved by	Product Management	Alfonso Fernandez	22.09.2025	AF
	Software Engineering	Julien Grossrieder	---	---
Document released by	Technical Publications	Peter Ward	22.09.2025	PW

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PREFACE

About these release notes

This document provides important information about the VibroSight® software from Parker Meggitt (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 7.8.0
  (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 7.7.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 Parker Meggitt documentation:

VibroSight® software data sheet
(document reference 660-020-005-228A)

Getting started with VibroSight® installation guide
(document reference 660-010-006-238A)

VibroSight® help

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

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

VM600Mk2 AMC10Mk2 + IOC10Mk2 temperature and analog monitoring modules data sheet
(document reference 268-140)

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 660-020-010-213A)

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 7.7.0 (document reference 660-010-013-240A)

- VibroSight 7.6.0 (document reference 660-010-013-239A)

- VibroSight 7.5.0 (document reference 660-010-013-238A)

- VibroSight 7.4.0 (document reference 660-010-013-237A)

- VibroSight 7.3.0 (document reference 660-010-013-236A)

- VibroSight 7.2.0 (document reference 660-010-013-235A)

- VibroSight 7.1.0 (document reference 660-010-013-234A)

- 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 Parker Meggitt (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 modules and the RLC16^{Mk2} relay module – standard and SIL versions, and the AMC10^{Mk2} + IOC10^{Mk2} temperature and analog monitoring modules, 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.

TABLE OF CONTENTS

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 7.8.0 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 Parker Meggitt (Meggitt SA) customer support. See 8 Customer support.

2 Features

General

2.1 Support for the VM600^{Mk2} AMC10^{Mk2} + IOC10^{Mk2} temperature and analog monitoring module

VibroSight 7.8.0 broadly enhances support for VM600^{Mk2} rack-based machinery protection and condition monitoring systems with the introduction of a new VM600^{Mk2} module, namely:

- VM600^{Mk2} AMC10^{Mk2} + IOC10^{Mk2} temperature and analog monitoring module.

VM600^{Mk2} AMC10^{Mk2} + IOC10^{Mk2} temperature and analog monitoring modules

The new VM600^{Mk2} AMC10^{Mk2} + IOC10^{Mk2} temperature and analog monitoring modules are designed for operation with the second generation of VM600^{Mk2} rack-based machinery monitoring system, from Parker Meggitt's vibro-meter® product line.

A VM600^{Mk2} AMC10^{Mk2} + IOC10^{Mk2} module consists of a processing module and an input /output module that together provide ten measurement channels of machinery protection and condition monitoring in VM600^{Mk2} systems.

The 10 measurement channels are configurable as temperature or analog inputs, and are compatible with thermocouples, resistance temperature detectors, and other/custom sensors (DC current). For thermocouples, internal or external cold-junction compensation (CJC) is supported. All measurement channels have individually configurable inputs, processing and outputs (with simultaneous data acquisition).

There is 1 processed output per channel, and multiple alarms per processed output with configurable limits, hysteresis and time delay. Logic functions (AND, OR and majority voting) are available for the combination of alarm

and status information, with 2 relays for use by alarms. There are also 10 analog outputs (4 to 20 mA signals) used to provide quasi-static outputs corresponding to measurements.

And like other VM600^{Mk2} modules, the AMC10^{Mk2} + IOC10^{Mk2} module features diagnostics (built-in self-test (BIST)), epoxy-sealed (or equivalent) relays, direct system Ethernet communications (100 Mbps), compatibility with VM600^{Mk2} system racks (ABE04x) and slimline racks (ABE056), software configuration, live insertion and removal of modules (hot-swapping) with automatic reconfiguration, etc.

NOTE:	For more detailed information, refer to the *VM600^{Mk2} AMC10^{Mk2} + IOC10^{Mk2} temperature and analog monitoring modules data sheet*.

In VM600^{Mk2} systems, the AMC10^{Mk2} + IOC10^{Mk2} temperature and analog monitoring module adds machinery protection and condition monitoring support for applications with large numbers of slowly-varying (quasi-static) analog signals, such as temperature and other process variables.

For VM600^{Mk2} AMC10^{Mk2} + IOC10^{Mk2} modules, both machinery protection and condition monitoring functionality are available by default. (For reference, for VM600^{Mk2} MPC4^{Mk2} + IOC4^{Mk2} machinery protection and condition monitoring modules, machinery protection functionality is available by default and condition monitoring functionality is optional.) However, it is important to note that condition monitoring functionality also depends on the purchased VibroSight$^{®}$ software license.

The VM600^{Mk2} AMC10^{Mk2} + IOC10^{Mk2} temperature and analog monitoring modules can be considered as second-generation replacements for the first generation VM600 AMC8 and IOC8T analog monitoring card pairs, which they effectively replace. (In the same way that the VM600^{Mk2} MPC4^{Mk2} + IOC4^{Mk2} machinery protection and condition monitoring modules replaced the VM600 MPC4 + IOC4T modules.)

NOTE:	The new VM600^{Mk2} AMC10^{Mk2} + IOC10^{Mk2} temperature and analog monitoring modules use the latest technology to offer improved performance compared to the old VM600 AMC8 and IOC8T analog monitoring card pairs.

VibroSight$^{®}$ machinery monitoring system software

The VM600^{Mk2} AMC10^{Mk2} + IOC10^{Mk2} modules are designed and optimized for operation with the VibroSight$^{®}$ machinery monitoring system software (in the same way as the VM600^{Mk2} MPC4^{Mk2} + IOC4^{Mk2} modules). Accordingly, VibroSight 7.8.0 includes significant updates in order to support the new VM600^{Mk2} AMC10^{Mk2} + IOC10^{Mk2} modules.

(For reference, the old VM600 AMC8 and IOC8T analog monitoring card pairs were configured and operated using the old VM600 MPSx software.)

As a result, users of VibroSight / VM600^{Mk2} systems who are familiar with the VM600^{Mk2} MPC4^{Mk2} + IOC4^{Mk2} will find it quick and easy to add and start using VM600^{Mk2} AMC10^{Mk2} + IOC10^{Mk2} modules in their applications.

In general, for VM600^{Mk2} AMC10^{Mk2} + IOC10^{Mk2} modules, as per other VM600^{Mk2} modules:

- VibroSight Protect is used for the configuration and operation of modules for machinery protection

- VibroSight Capture is used for the configuration and operation of modules for condition monitoring

- VibroSight System Manager is used for the general management of modules

- VibroSight Vision is used for the display and analysis of measurement data.

VibroSight Protect and the VM600^{Mk2} AMC10^{Mk2} + IOC10^{Mk2} module

VibroSight Protect is the VibroSight software module, featuring a modern and ultra-clear user-interface, designed for the configuration and operation of VM600^{Mk2} systems for machinery protection.

VibroSight Protect allows for the configuration of complete VM600^{Mk2} systems, consisting of:

- VM600^{Mk2} racks – 6U (ABE04x system racks) and 1U (ABE056 slimline racks)

- VM600^{Mk2} MPC4^{Mk2} + IOC4^{Mk2} modules

- VM600^{Mk2} RLC16^{Mk2} modules

- VM600^{Mk2} AMC10^{Mk2} + IOC10^{Mk2} modules

- VM600^{Mk2} CPUM^{Mk2} + IOCN^{Mk2} rack controller and communications interface modules.

NOTE:	VibroSight Protect is completely separate and distinct to VibroSight Capture and VibroSight Configurator in order to ensure the complete separation ("segregation") of machinery protection and condition monitoring in a VM600 rack.

VibroSight Protect user interface – Welcome screen

When VibroSight Protect starts, the Welcome screen displays a view that allows the user to create a new VM600^{Mk2} system configuration (New system), open an existing VM600^{Mk2} system configuration file (Open Protect file), duplicate an existing VM600^{Mk2} system configuration file (Duplicate Protect file), or connect to VM600^{Mk2} system hardware (Connect to system).

This is shown in Figure 1.
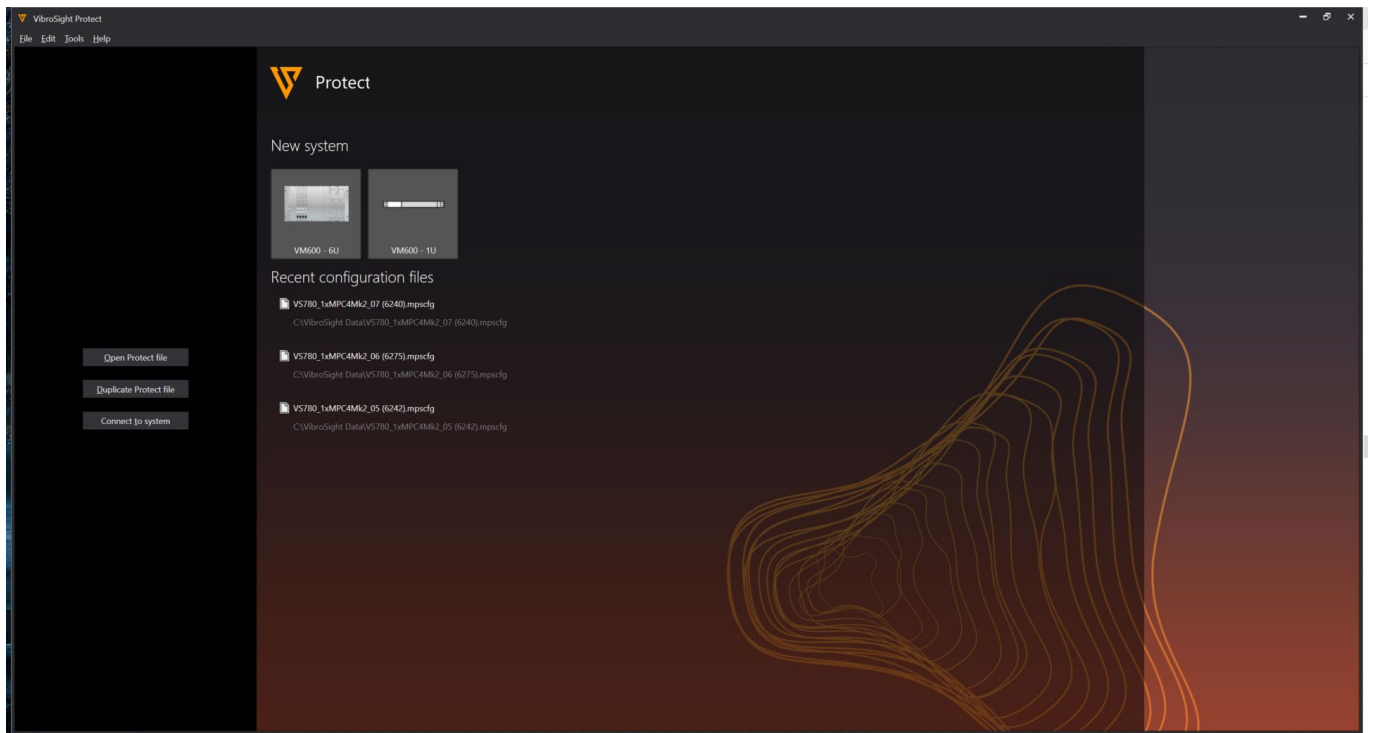
Figure 1: VibroSight Capture Welcome screen

Alternatively, File menu commands can be used to perform the same functions (New, Open, Duplicate, Connect).

For example, to start working on a new VM600^{Mk2} system configuration using a VM600 system rack (ABE04x), click the VM600 - 6U icon.

When working on a VM600^{Mk2} system (new or existing), the VibroSight Protect user interface consists of three main tabs/pages: Layout, Configure and Dashboard.

VibroSight Protect user interface – Layout tab/page

The Layout tab/page is used for the configuration and display of general information for the VM600 rack / VM600^{Mk2} system.

For example, a VM600^{Mk2} system consisting of a single VM600^{Mk2} AMC10^{Mk2} + IOC10^{Mk2} module is shown in Figure 2.
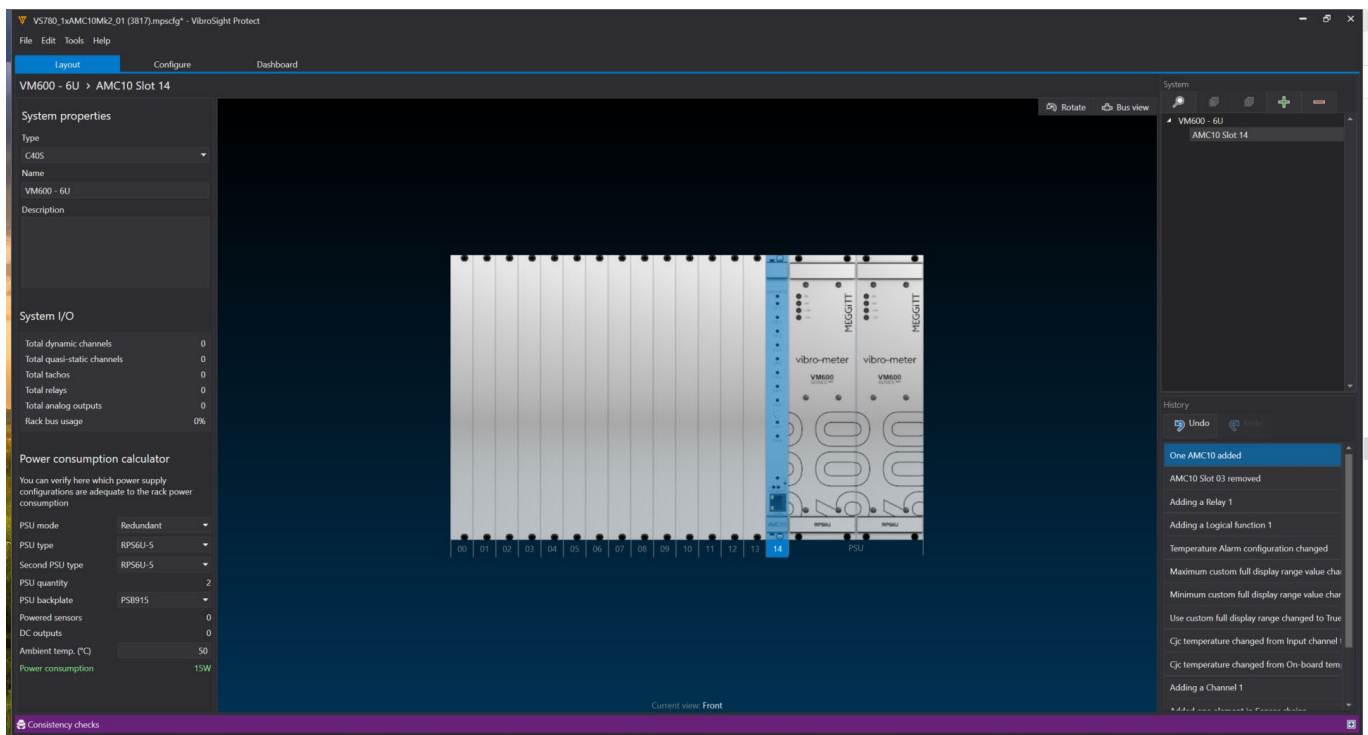
Figure 2: VibroSight Protect Layout tab/page

System properties (left) is used to define information about the rack, including the specific type of rack.

System I/O (left) provides summary information on the inputs, outputs and resources used by the rack. This is dynamically updated as modules are added to the rack and configured.

Power consumption calculator (left) is used to define information about the power supply configuration used by the rack. This is dynamically updated as modules are added to the rack and configured, so that the user knows if the power supply configuration is suitable for the populated rack.

Main window (centre) is used to add modules to the rack. Double-clicking a blank (empty) rack position/slot allows a new module to be selected for that position/slot.

For example:

AMC10^{Mk2} modules can be added in position/slots 3 to 14 (front of rack). When a AMC10^{Mk2} module is added, the associated AMC10^{Mk2} module is automatically added in the corresponding position/slot in the rear of the rack, as per MPC4^{Mk2} modules.

RLC16^{Mk2} modules can be added in position/slots 1 to 14 (rear of rack).

In the main window, the Rotate control (top right) is used to toggle the view of the rack between the front view or the rear view.

In the main window, the Bus view control (top right) is used to toggle the view between the rack view or the rack buses view.

The Bus view is shown in Figure 3.
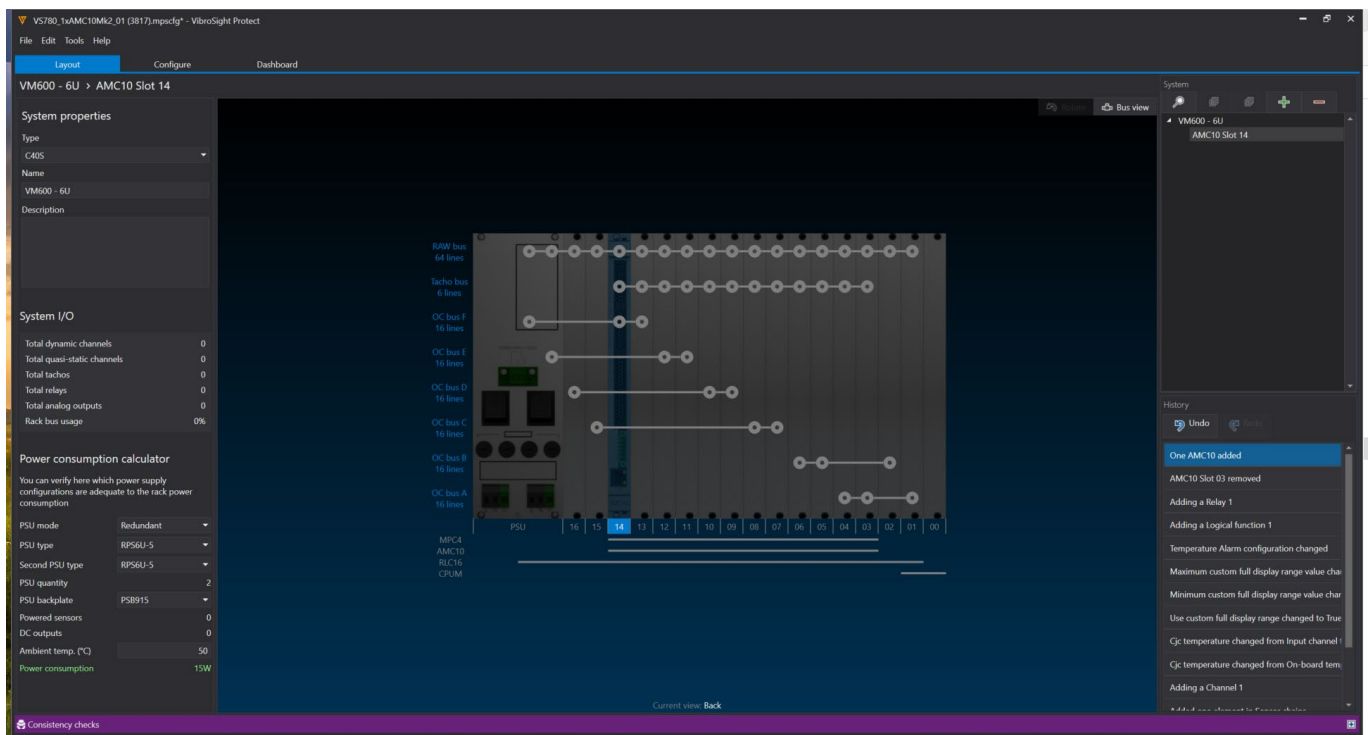
Figure 3: VibroSight Protect Layout tab/page – Bus view

In the Bus view, the rack buses are shown as grey if unused or shown as blue if used. If a bus is used, then jumpers on the IOC10^{Mk2} (and any RLC16^{Mk2} if used) must be manually configured. Jumper configuration is available from the Configure tab/page by selecting each module and then its Jumpers tab, as per MPC4^{Mk2} modules.

To display more detailed information on the configuration and usage of individual VM600 rack buses, click one of the bus names (left of rack) on the Bus view in order to display an individual bus window:

- Raw bus
  64 lines
- Tacho bus
  6 lines
- OC Bus F
  16 lines
  to
  OC Bus A
  16 lines

The individual bus windows for the Tacho bus, Raw bus and OC Bus n display detailed information on the configuration and usage of the individual VM600 rack bus. Initially, they show the default bus configuration as determined by VibroSight Protect for the application. They also allow the automatically assigned bus configuration to be changed, should this become necessary.

System (right) is used to remove modules from the rack.

History (right) is used to undo or redo recent changes to the rack using the "–" icon (Remove item).

Consistency checks

Consistency checks (bottom) is used to run and/or display consistency check information so that any problems in the VM600Mk2 system configuration can be corrected.
Clicking on the Consistency check title bar expands or collapses the consistency check window, as required.
Clicking on the "play" triangle (top left) in the expanded consistency check window will run the consistency check.
The Consistency check title bar is displayed in purple if no problems are detected but is displayed in red if problems are detected.

VibroSight Protect user interface – Configure tab/page

The Configure tab/page is used for the configuration and display of general information for the modules in the VM600 rack / VM600^{Mk2} system, that is, the VM600^{Mk2} AMC10^{Mk2} + IOC10^{Mk2} (and any RLC16^{Mk2} if used), as per MPC4^{Mk2} modules.

This is shown in Figure 4.
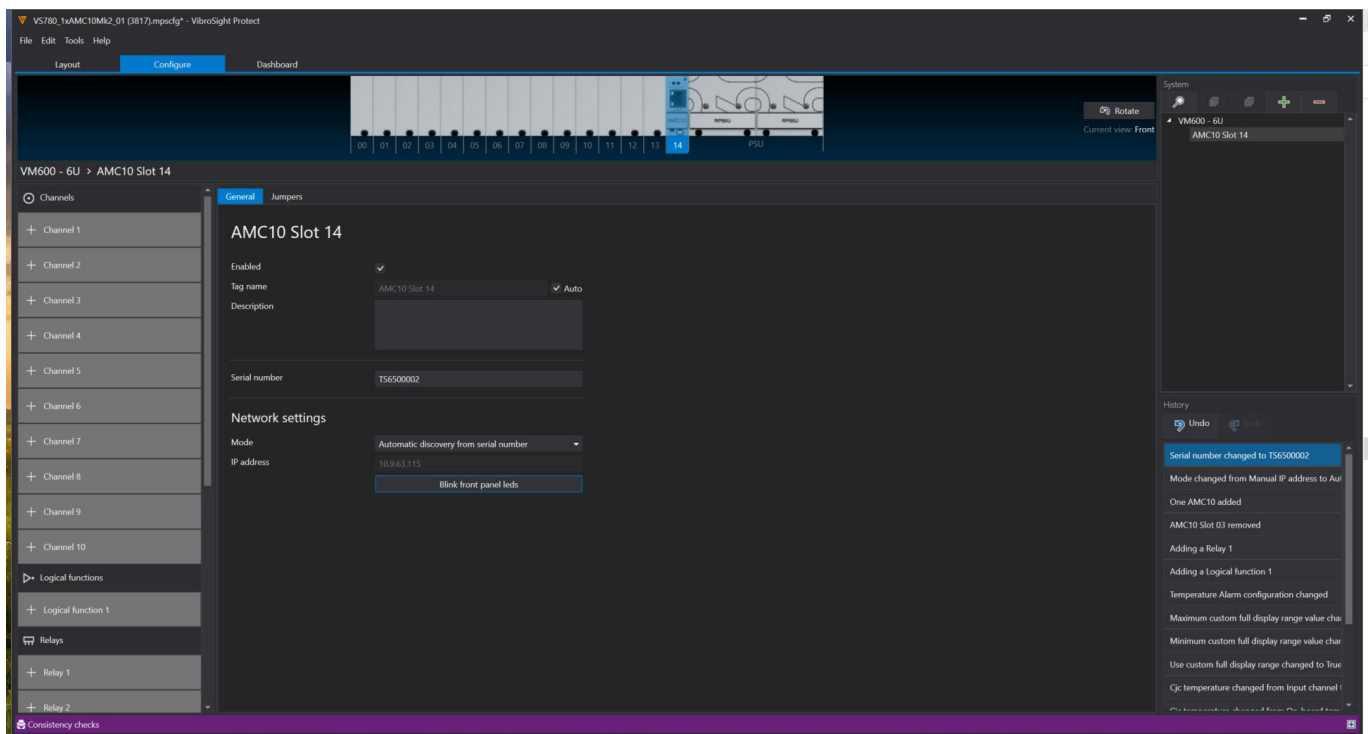
Figure 4: VibroSight Protect Configure tab/page – General information (module level)

Main window (top) shows the bottom portion of the rack configured in the Layout tab/page.

As in the Layout tab/page, the Rotate control (top right) is used to toggle the view of the rack between the front view or the rear view.

When a VM600^{Mk2} module is selected in the rack (top) by clicking on it, the main features for the module are displayed in functional groups in the main window (left) and general information for the module is displayed in the main window (centre).

For a VM600^{Mk2} AMC10^{Mk2} + IOC10^{Mk2} module, the main features are Channels, Logical functions, Relays and Analog outputs (note: you may need to scroll down (left) to see everything).

The General tab includes Enabled control, Tag name, Description and Serial number settings for the module. There are also the Network settings (Mode and IP address) for the module. And a Blink front panel LEDs control that can be used to help identify the module in a rack.

NOTE:	For users who are more familiar with the VM600^{Mk2} MPC4^{Mk2} + IOC4^{Mk2} machinery protection and condition monitoring module, please be aware that the VM600^{Mk2} AMC10^{Mk2} + IOC10^{Mk2} does not support two features that are not supported by the module VM600^{Mk2} MPC4^{Mk2} + IOC4^{Mk2} module, namely: • A "Watch RLC16 relay status" option that allows the MPC4^{Mk2} to monitor the status of an associated VM600^{Mk2} RLC16^{Mk2}. • A status (common circuit-fault relay (FAULT)) relay.

The Jumpers tab provides any jumper configuration, if required.

When an item is selected from a functional group in the main window (left), the main window (centre) updates to display the information for the item, including all configurable parameters.

For example, when configuring a measurement channel, the information displayed in the main window includes General, Processing, Alarms and Full display range tabs, which allows each of these elements to be reviewed and/or edited (after initial configuration).

This is shown in Figure 5.
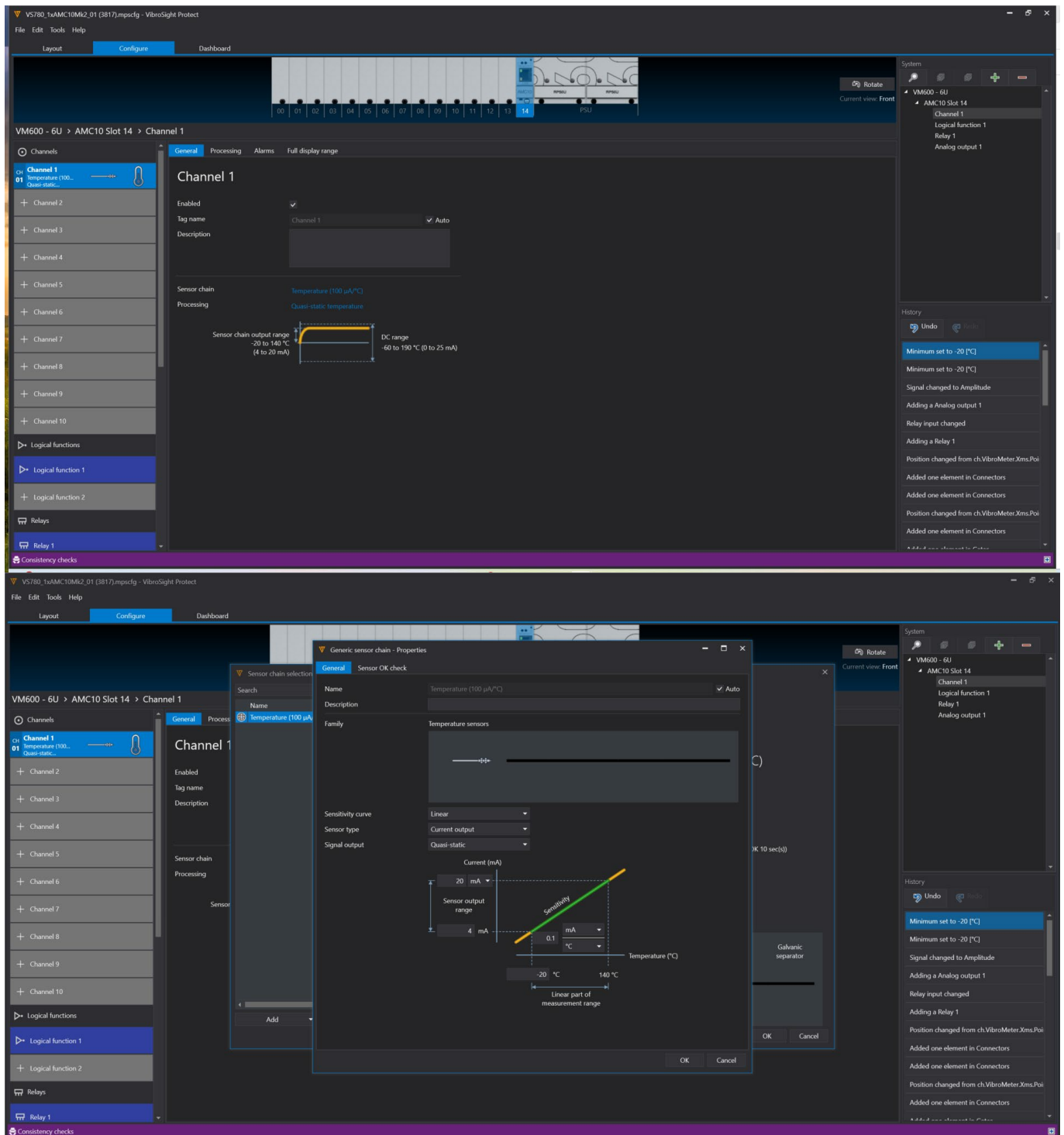
Figure 5: VibroSight Protect Configure tab/page – Configuring a measurement channel

For all VM600^{Mk2} modules

To configure the network communication settings for a VM600^{Mk2} module, on the Configure tab/page, select the module (top), then in the main window (centre), on the **General** tab, under **Network settings**, use the **Mode** and other controls to determine how VibroSight Protect should find the IP address to be used for communication with the module:

- With **Mode: Automatic discovery from serial number**, the module is automatically identified using the serial number that is entered manually in the **Serial number** text box.

NOTE:	The serial number of a VM600^{Mk2} module can be found by inspecting the labels (stickers) on the module hardware (for example, front panel) or by using VibroSight System Manager.

The card's IP address will then automatically be read by VibroSight Protect for use by the system and displayed in the **IP address** text box.

NOTE:	VibroSight uses a proprietary implementation of the zero-configuration networking (zeroconf) protocols in order to support networking operations such as the automatic discovery of VM600^{Mk2} modules.
	If the automatic discovery does not work (for example, due to a network not meeting the requirements of zeroconf), then connections between VibroSight-system components can be established manually by entering the IP addresses of the network devices.

- With **Mode: Manual IP address**, the module is identified using the IP address that is entered manually in the **IP address** text box (in which case, the **Serial number** is effectively ignored).

NOTE:	In VibroSight Protect, the **IP address** text box is used to display the IP address (**Mode: Automatic discovery from serial number**) or enter the IP address (**Mode: Manual IP address**) to be used for communication with a VM600^{Mk2} module – but it cannot be used to change an IP address.
	VibroSight System Manager is used to change the IP address of VM600^{Mk2} modules, as required by an application.

For VM600^{Mk2} AMC10^{Mk2} + IOC10^{Mk2} modules

When a Channel is selected for a VM600^{Mk2} AMC10^{Mk2} + IOC10^{Mk2} module by clicking on it (in a functional group, left) and the channel is not yet configured, a Configuration of a Channel window is displayed that guides the user through the configuration of the channel in terms of:

- Processing type: single-channel, dual-channel or muti-channel.

- Processing function (based on sensor family), including:

    o Single-channel:

        ▪ Position processing for Proximity probes

        ▪ Quasi-static pressure processing for Pressure sensors

        ▪ Quasi-static temperature processing for Temperature sensors

        ▪ Custom quasi-static processing for Other sensors.

    o Dual-channel:

        ▪ Delta quasi-static pressure processing for Pressure sensors

        ▪ Delta quasi-static temperature processing for Temperature sensors

        ▪ Mathematical function processing for Any/Other sensors.

    o Multi-channel:

        ▪ Temperature aggregation processing for Temperature sensors.

- Input signal: From a library of sensors / measurement chains.

Note: The default library (global sensors catalog) can be expanded by editing sensors / measurement chains and/or adding new ones (vibro-meter ® or third-party), as required.

NOTE:	For information on configuring temperature sensors / measurements chains such as RTDs, thermocouple temperature sensors and other non-linear sensors defined by polynomial coefficients, see also 2.6 VibroSight Capture and non-linear sensors / measurement chains.

Once the Channel is configured, the information for the channel is displayed in a series of tabs (General, Processing, Alarms, Full display range).

When a Channel is selected for a VM600^{Mk2} AMC10^{Mk2} + IOC10^{Mk2} module by clicking on it and the channel is already configured, the information for the channel is displayed in a series of tabs (General, Processing, Alarms, Full display range).

For each Channel, the General, Processing, Alarms and Full display range tabs must be edited in the main window (centre) to configure the parameters and functionality for the channel, as required by the application. See Figure 5.

Similarly, when a Logical function, Relay or Analog output is selected for a VM600^{Mk2} AMC10^{Mk2} + IOC10^{Mk2} module by clicking on it (in a functional group, left), the information and parameters for the feature are displayed in the main window (centre), where they must be edited, as required by the application.

NOTE:	As the configuration for a VM600^{Mk2} system is being developed, the Consistency Check window (bottom) should be used to help correct any configuration errors and warnings as they occur, thereby helping ensure that a valid configuration is arrived at.

Activating a configuration on a VM600Mk2 system

Once a configuration has been created and/or changed, and there are no consistency check errors, the configuration must be uploaded to the VM600^{Mk2} system in order to actually run on the system hardware, for example, a VM600^{Mk2}/VM600 rack containing a VM600^{Mk2} AMC10^{Mk2} + IOC10^{Mk2} module.

The File > System activation command is used to upload the complete VM600^{Mk2} system configuration currently active/loaded in VibroSight Protect to the system hardware.

As part of the system activation process, VibroSight Protect will upload each individual VM600^{Mk2} module in turn with its part of the complete VM600^{Mk2} system configuration, then read back each individual module configuration in order to check it against the complete VM600^{Mk2} system configuration again, thereby ensuring that the configuration was uploaded to each individual module correctly.

Once this check is complete, VibroSight Protect will prompt the user to continue ("Proceed").

After the user has clicked Proceed, VibroSight Protect will:

- Archive the running configuration
  (in case it needs to be reverted to should something go wrong with the activation of the configuration).

- Activate the current configuration.

- Run with the new configuration.

Once configured, VibroSight Protect will inform the user with a "Success!" message.

This is shown in Figure 6.
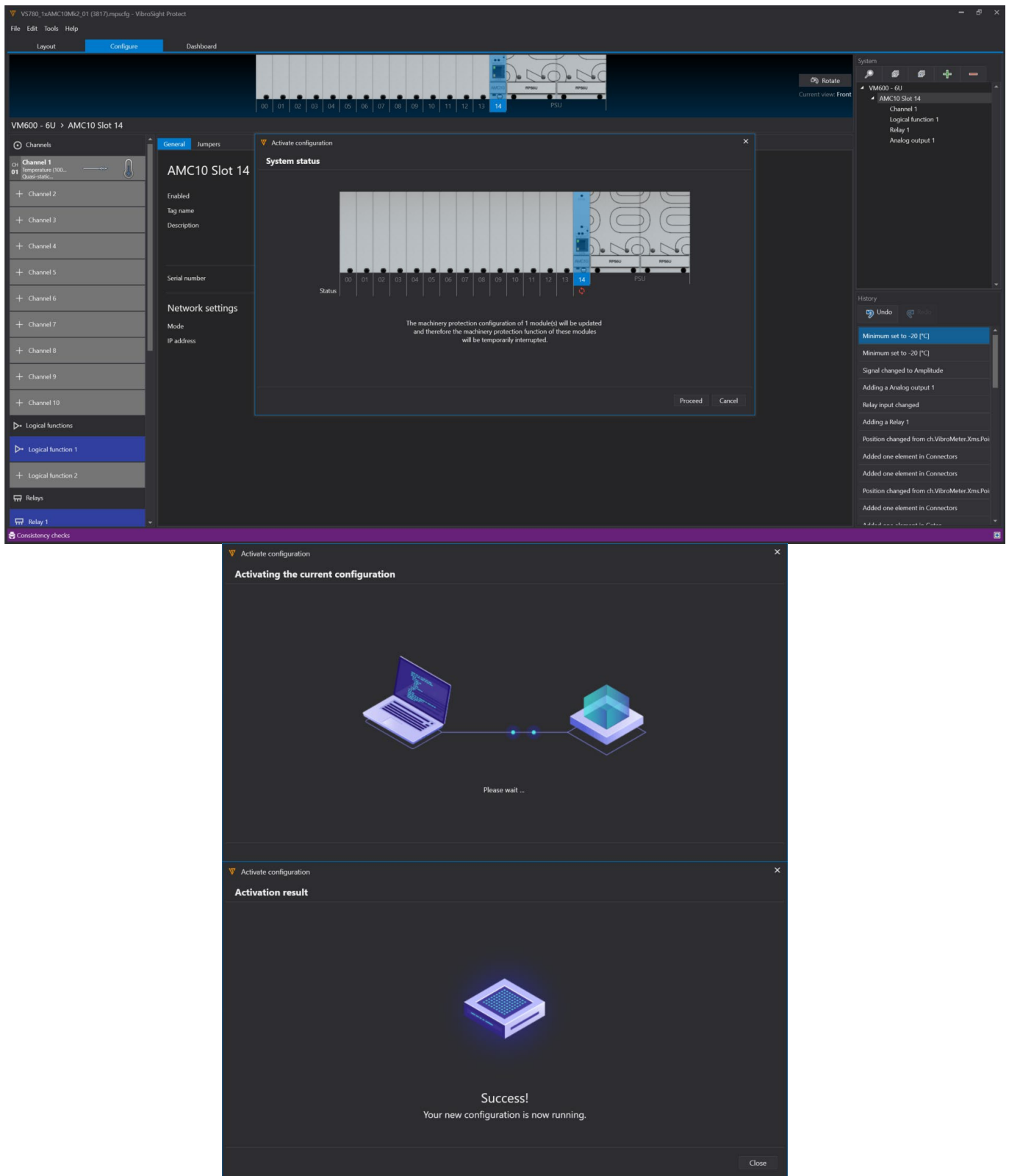
Figure 6: VibroSight Protect system activation – upload, check and activation

Please note that when activating a configuration on a VM600^{Mk2} system:

- All of the modules contained in the configuration must be available at the same time. More specifically, all VM600^{Mk2} modules must be connected to and available on the same network as the computer running VibroSight Protect. (This is typically done using a network switch.)
- When a configuration is uploaded to a VM600 rack, a VM600^{Mk2} module will restart after receiving the configuration in order to enter its power-up mode and perform a power-on self-test (POST), thereby helping to ensure that the configuration is correct and valid.

   Note: When a AMC10^{Mk2} module resets, it temporarily enters the Power-up mode where it takes approximately 25 seconds to boot and complete its power-on self-test (POST). After a successful POST, the module automatically enters the Operational mode if machinery protection firmware is available or enters the Recovery mode if machinery protection firmware is not available.

- After successfully booting, a VM600^{Mk2} AMC10^{Mk2} module will jump to its operational mode and start to provide measurement data, in accordance with its configuration.

VibroSight Protect user interface – Dashboard tab/page

The Dashboard tab/page is used to operate and manage the VM600^{Mk2} system, that is, a system that is running a configuration.

An example for a VM600^{Mk2} AMC10^{Mk2} + IOC10^{Mk2} module is shown in Figure 7.
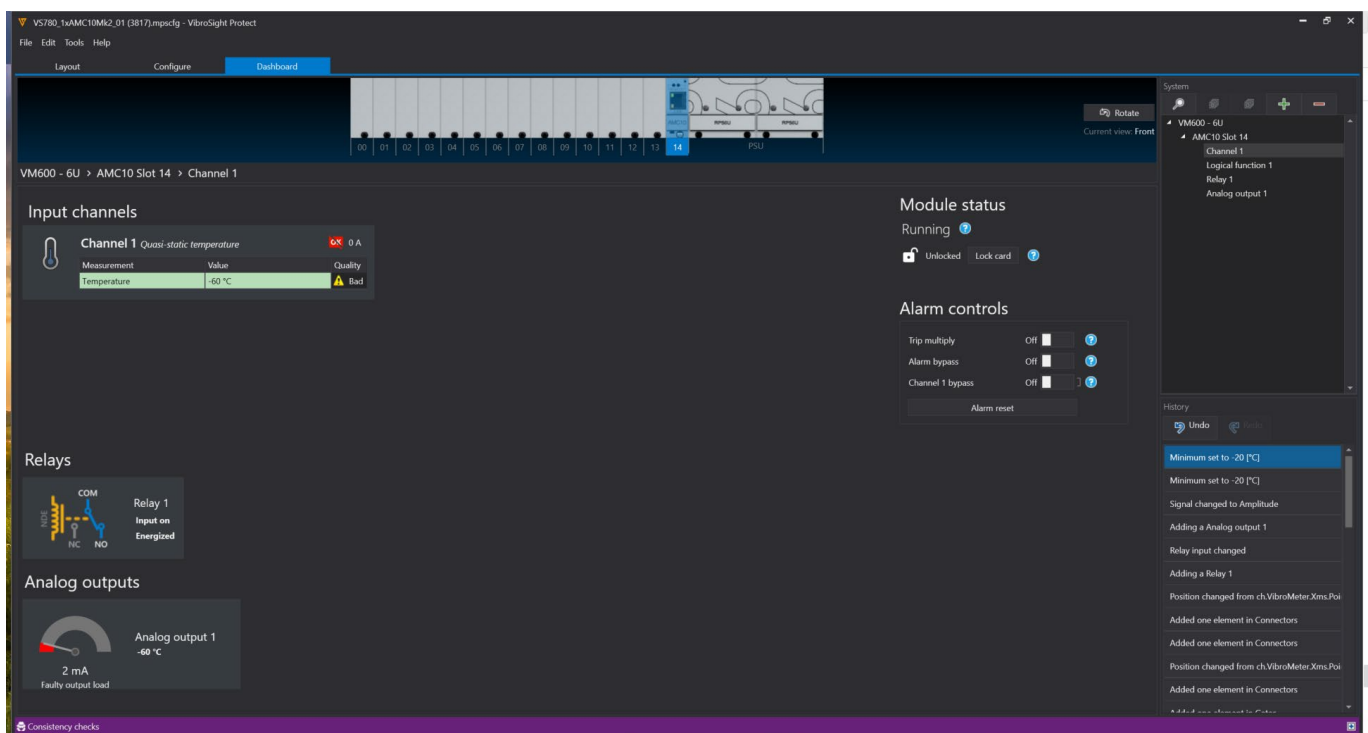
Figure 7: VibroSight Protect Dashboard tab/page

For VM600^{Mk2} AMC10^{Mk2} + IOC10^{Mk2} modules, the functionality available from the VibroSight Dashboard tab/page, includes includes measurement information, control inputs and status information such as:

- Channel measurement values, data quality information, and sensor OK check.

- Module status information (Running, Locked or Unlocked), and controls (Lock/Unlock card).

- Alarm controls: Trip multiply (TM), Alarm bypass (AB), and individual channel bypasses.

- Relays and analog output information.

VibroSight System Manager and VM600^{Mk2} systems

For VM600^{Mk2} systems, VibroSight System Manager is used for general management of VM600^{Mk2} modules, such the VM600^{Mk2} AMC10^{Mk2} + IOC10^{Mk2} module. This includes the display of useful system information for modules.

This is shown in Figure 8.

In VibroSight System Manager, in the System Explorer window (left), VM600^{Mk2} AMC10^{Mk2} + IOC10^{Mk2} modules are listed under AMC10 modules (see Figure 8).

In general, for VM600^{Mk2} modules in VibroSight System Manager, functionality is available from the Actions window (right) and general information is displayed in the main window (centre).

For example, as shown in shown in Figure 8 (centre), under General Information, this includes module part numbers (PNRs), serial numbers (SNRs), the VM600^{Mk2}/VM600 rack position/slot number, the status of the machinery protection and condition monitoring running on the module, etc.
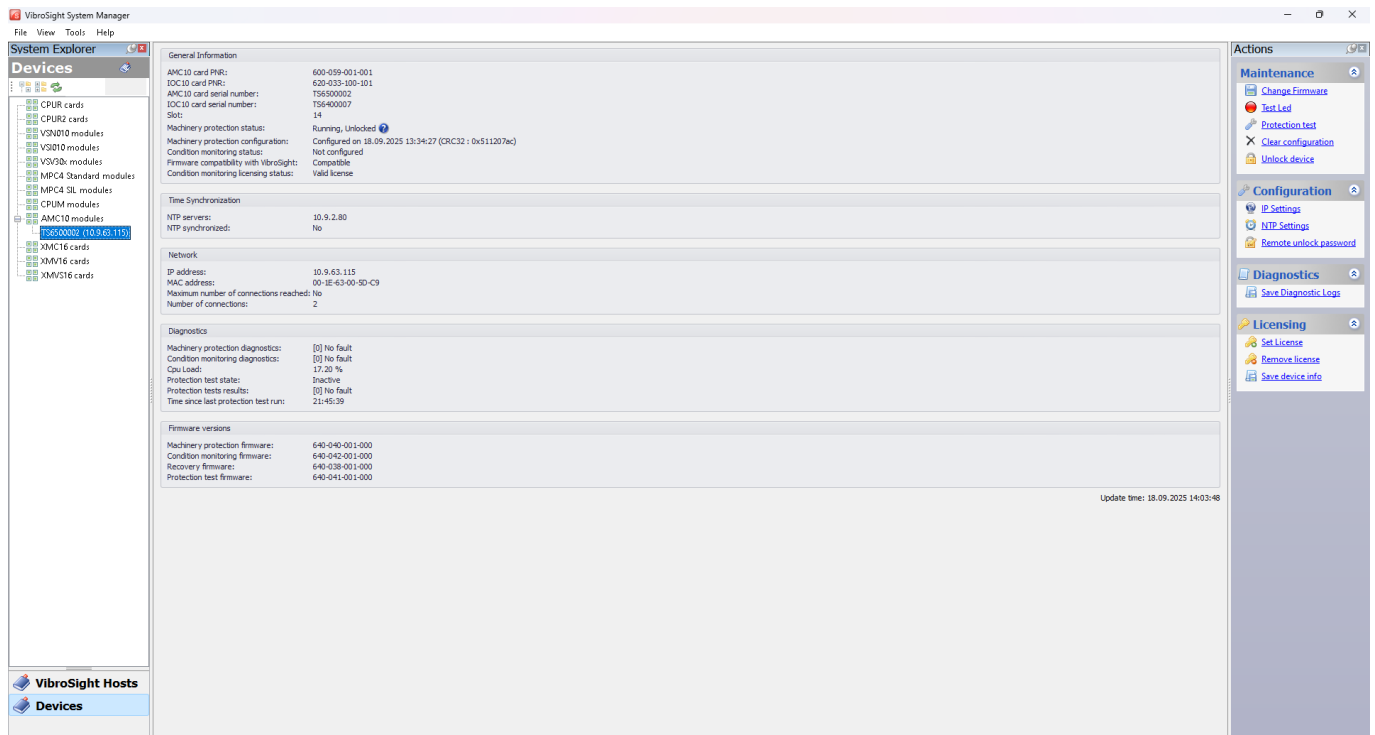
Figure 8: VibroSight System Manager information and actions for a AMC10^{Mk2} module

For the VM600^{Mk2} AMC10^{Mk2} + IOC10^{Mk2} temperature and analog monitoring module, as per MPC4^{Mk2} modules, the main operating mode of the module is the Operational mode ("Machinery protection status: Running"), which has two modes:

- Locked (safety/secure operating mode)
  When Locked, a AMC10^{Mk2} module (VM600^{Mk2} MPS) performs its monitoring and protection functions while ensuring the security of the modules/system and it's configuration. That is, the configuration cannot be changed and maintenance activities cannot be performed.

- Unlocked (maintenance operating mode)
  When Unlocked, a AMC10^{Mk2} module (VM600^{Mk2} MPS) performs its monitoring and protection functions without ensuring the security of the modules/system and it's configuration. That is, the configuration can be changed and maintenance activities can be performed.

NOTE: In general, physical access to a VM600^{Mk2} system (specifically, the buttons on the front panel of VM600^{Mk2} module) is required in order to change the operating mode and therefore to be able to change the machinery protection (MPS) functionality for a VM600^{Mk2} system.

The Lock state is shown under General information (see Figure 8), as part of the Machinery protection status. For example: …, Unlocked or …, Locked.

NOTE:	VM600Mk2 AMC10Mk2 + IOC10Mk2 temperature and analog monitoring modules also support the new remote unlocking feature, as per the VM600Mk2 MPC4Mk2 + IOC4Mk2 machinery protection and condition monitoring module. See 2.2 VibroSight Protect and remote unlocking of the VM600Mk2 MPC4Mk2 module.

Figure 8 (Actions window, right) also shows the various actions/tasks that VibroSight System Manager can perform for AMC10Mk2 modules, notably:

- Maintenance: Changing firmware, testing (blinking) front panel LEDs, running a protection test, clearing a configuration, and unlocking a module.

- Configuration: Configuration of IP and NTP settings, setting a "remote unlock" password for a module.

- Diagnostics: Download of diagnostics log files from a module.

- Licensing: Managing licensing for a module.

  For VM600Mk2 AMC10Mk2 + IOC10Mk2 modules, both machinery protection and condition monitoring functionality are available by default. That is, all AMC10Mk2 modules have condition monitoring enabled, that is, they are supplied with a AMC10Mk2 CMS license pre-installed.)

  Note: AMC10Mk2 condition monitoring also requires a VibroSight ® software edition / license that supports condition monitoring.

VM600Mk2 AMC10Mk2 + IOC10Mk2 module factory assigned defaults

Unless already configured as part of a VM600Mk2 solution, VM600Mk2 AMC10Mk2 + IOC10Mk2 modules are supplied with the following factory assigned defaults:

- Communications: LAN (Ethernet) port configured as Enabled using dynamic addressing (DHCP).

- Firmware: Loaded with latest version of Recovery firmware (`640-038-vvv-ppp.Amc10Fw`) only.

Accordingly, the LAN (Ethernet) port must be configured to meet your communication requirements and the latest version of the machinery protection and condition monitoring firmwares (`640-040-vvv-ppp.Amc10Fw` and `640-042-vvv-ppp.VxeFw`) must be uploaded.

See also 2.16 AMC10Mk2 + IOC10Mk2 module firmware.

Note: Both of these tasks are performed using VibroSight System Manger, as per other VM600Mk2 modules.

2.2 VibroSight Protect and remote unlocking of the VM600^{Mk2} MPC4^{Mk2} module

For the VM600^{Mk2} MPC4^{Mk2} + IOC4^{Mk2} machinery protection and condition monitoring module, the main operating mode of the module is the Operational mode, which has two modes:

- Locked (safety/secure operating mode)

  When Locked, a MPC4^{Mk2} module (VM600^{Mk2} MPS) performs its machinery protection functions while ensuring the security of the module/system and it's configuration. That is, the configuration cannot be changed, and maintenance activities cannot be performed.

- Unlocked (maintenance operating mode)

  When Unlocked, a MPC4^{Mk2} module (VM600^{Mk2} MPS) performs its machinery protection functions without ensuring the security of the module/system and it's configuration. That is, the configuration can be changed, and maintenance activities can be performed.

NOTE:	For the standard version of the MPC4^{Mk2} + IOC4^{Mk2} module, machinery is protected when the MPC4^{Mk2} module's main operating mode is Locked or Unlocked.
	For the SIL version of the MPC4^{Mk2} + IOC4^{Mk2} module, machinery is protected only when the MPC4^{Mk2} SIL module's main operating mode is Locked. That is, in safety-related applications, a MPC4^{Mk2} SIL module module can only run in the Locked state.

In general, physical access to a MPC4^{Mk2} module is required in order to change the Operational mode (from Locked to Unlocked, and vice versa), as this is typically done using button 2 on the front panel of the module.

To switch between the two modes:

- When Locked (safety/secure operating mode), press button 2 (right) 5 times within 5 seconds to switch to Unlocked.

  Note: When a standard or SIL MPC4^{Mk2} module is Locked, the LOCK LED on the front panel of the module is solid green.

- When Unlocked (maintenance operating mode), press and hold button 2 (right) for at least 1 second to switch to Locked.

  Note: When a standard MPC4^{Mk2} module is Unlocked, the LOCK LED on the front panel of the module blinks/flashes green. When a SIL MPC4^{Mk2} module is Unlocked, the LOCK LED on the front panel of the module is solid red.

In addition to the LOCK LED, the VibroSight software also indicates the mode of a MPC4^{Mk2} module:

- In VibroSight System Manager, when the module is selected (left), in the main window (centre), under General information, Machinery protection status will show either …, Locked or …, Unlocked, as appropriate.

- In VibroSight Protect, on the Dashboard tab/page, in the main window (centre), Module status (right) will show either Locked or Unlocked, as appropriate.

Starting with VibroSight 7.8.0 and the latest MPC4^{Mk2} module firmware(s), it is now also possible to remotely unlock a MPC4^{Mk2} module using the VibroSight software (that is, change the Operational mode from Locked to Unlocked) without physical access to the module.

However, it is important to note that a "remote unlock" password must have been set for the MPC4^{Mk2} module before remote unlocking can be used. This is a important security feature that helps prevent accidental or unauthorized use of MPC4^{Mk2} module remote unlocking.

NOTE:	Before remote unlocking can be used with a MPC4^{Mk2} module, a "remote unlock" password must have been set for the module, which is done using VibroSight System Manager.

To set a "remote unlock" password for a MPC4^{Mk2} module:

- Put the MPC4^{Mk2} module in to Recovery mode, as this is required in order to set a "remote unlock" password:
  - Press and hold both button 1 (left) and button 2 (right) for at least 2 seconds to reset (reboot) the module, then release button 2 while keeping button 1 pressed for a further 5 seconds.

    Note: When a standard or SIL MPC4^{Mk2} module is in Recovery mode, the LOCK LED on the front panel of the module blinks/flashes red, green, red, green … .

NOTE:	It is important to note that entering the Recovery mode automatically clears the module's configuration (including any previously set "remote unlock" password), which means that the module (system) must be reconfigured after leaving the Recovery mode – before normal system operation can be resumed.

- In VibroSight System Manager, in the System Explorer window (left), Devices, select the module.

- In the main window (centre), under General information, Machinery protection status will show Recovery, Unlocked.

- In the Actions window (right), under Configuration, select Remote unlock password.

- In the Remote unlock password set window, select Enabled, then enter and confirm the password.

  Note: The password must be at least 22 characters long and include a combination of uppercase and lowercase letters, numbers and special characters.

- Return the MPC4^{Mk2} module to Operational mode:

  - For example, press and hold both button 1 (left) and button 2 (right) for at least 2 seconds to reset (reboot) the module.

    Note: When a MPC4^{Mk2} module resets, it temporarily enters the Power-up mode where it takes approximately 25 seconds to boot and complete its power-on self-test (POST). After a successful POST, the module automatically enters the Operational mode if machinery protection firmware is available or enters the Recovery mode if machinery protection firmware is not available.

A MPC4^{Mk2} module can be remotely unlocked using VibroSight System Manager or VibroSight Protect.

In VibroSight System Manager:

- In the System Explorer window (left), Devices, select the module.

- In the main window (centre), under General information, Machinery protection status will show …, Locked.

- In the Actions window (right), under Maintenance, click Unlock device.

- In the Unlock device window, enter the ("remote unlock") password, then click Next.

- VibroSight System Manager will update to display a message confirming when the MPC4^{Mk2} module is unlocked, and in the main window (centre), under General information, Machinery protection status will show …, Unlocked.

NOTE:	Please note that VibroSight System Manager can be used to remotely unlock a MPC4^{Mk2} module (password protected) only.

In VibroSight Protect:

- On the Dashboard tab/page, select the module (rack view, top).

- In the main window (centre), Module status (right) will show Locked, and the Unlock card control.

- Under Module status (right), click the Unlock card control.

- In the MPC4 card unlock window, enter the ("remote unlock") password, then click OK.

- Module status (right) will update to show Unlocked, and the Lock card control.

NOTE:	Please note that VibroSight Protect can be used to remotely unlock a MPC4^{Mk2} module (password protected) and remotely lock a MPC4^{Mk2} module (not password protected).

2.3 VibroSight Capture and machine train orientation

In VibroSight Capture, on the Machinery tab/page that is used to build/draw machine trains in order to help organize and visualize the measurements and the machinery being monitored, the design and handling of machine trains and machinery components has been improved such that it is now possible to represent vertical machines and/or horizontal machines more easily and accurately – in order to better reflect the reality of the machinery being monitored.

(Previously, only horizontal machine trains were permitted but they can now be configured as either horizontal or vertical, as determined by an application.)

For example, in VibroSight Capture, on the Machinery tab/page:

- In the Machine train properties window (left), the Layout control is now used to select the orientation of the machine train as either Horizontal (the default) or Vertical.
- Depending on the selected orientation (Layout: Horizontal or Vertical), when the "+" (connection point) control is used to add a new machinery component to the machine train, the orientation of the machinery component will automatically be adapted to match the layout.
- At any time, the Layout control (left) can be used to change the orientation of the layout from horizontal to vertical (and vice versa) and the machine train and machinery components will automatically be adapted to match.

In general, for the new vertical orientation (layout) of machine trains:

- Machinery components shall be rotated 90° clockwise and displayed as a column instead of as a row.
- Bearings shall be numbered incrementally from top to bottom.
- Machine names shall be displayed horizontally to the right of the machine train.
- The machine train name shall be displayed horizontally on the top of the machine train.
- Sensor position indicators shall be displayed to the left of the machine train and shall NOT be rotated. For example a sensor located at 0° EU shall be displayed on the top of the sensor position indicator in a horizontal or in a vertical machine train.
- Elements that are on top of the horizontal machine train shall be displayed on the left in the vertical machine train. For example:
  - o Machine name
  - o Sensor position indicator
  - o Tacho sensor.
- Elements that are on the bottom of the horizontal machine train shall be displayed on the right in the vertical machine train. For example:
  - o Connecting processing list
  - o Toolbar.

Further, the orientation (layout) of machine trains as drawn in the Machinery tab/page will also be used for the same machine trains in the Connect tab/page.

2.4 VibroSight Capture and machinery component flipping

In VibroSight Capture, on the Machinery tab/page that is used to build/draw machine trains in order to help organize and visualize the measurements and the machinery being monitored, the design and handling of certain machinery components has been improved such that it is now possible to "flip" some machinery components – in order to better reflect the reality of the machinery being monitored.

More specifically, certain machinery components can now be flipped (or reversed), as follows:

- In a machine train with a horizontal orientation (Layout: Horizontal), flipping a machinery component will redraw the component flipped though a vertical axis (effectively a mirror image).
- In a machine train with a vertical orientation (Layout: Vertical), flipping a machinery component will redraw the component flipped though a horizontal axis (effectively turned upside down).

The flippable machinery components include the following:

- Machines, Steam turbine:
  - Single flow
  - HP-IP.
- Bearings:
  - Axial journal bearing
  - Axial rolling bearing.
- Shafts:
  - Single taper.

To flip a machinery component:

- In VibroSight Capture, on the Machinery tab/page, use the "+" (connection point) control to add a flippable machinery component to a machine train.
- In the machine train, click the machinery component to select it and a pop-up context menu will appear beside the component, as follows:
  - For a flippable machinery component, the menu is: . Note the Flip control (right): .
  - While for a non-floppable machinery component, the menu is: .
- On the pop-up context menu, click the Flip control to flip the machinery component.

2.5 VibroSight Capture and reference speeds

In VibroSight Capture, a reference speed can be configured for a machine train in order to nominate a speed input from a tacho channel that is to be used as the speed reference by signal processing that requires such an input (for example, a VM600^{Mk2} MPC4^{Mk2} + IOC4^{Mk2} machinery protection and condition monitoring module auxiliary input).

To configure a reference speed:

- In VibroSight Capture, on the Machinery tab/page, build/draw a machine train.
- On the Systems tab/page, import a system (for example, from a VibroSight Protect configuration/system).
- On the Connect tab/page, connect the measurement points (from the system) to the machine train.

  When a speed input from a tacho channel (that is, a VM600^{Mk2} MPC4^{Mk2} + IOC4^{Mk2} module auxiliary input) is connected to the machine train, the user will be prompted to use this speed input as the reference speed for the machine train.

  If the user confirms, then VibroSight Capture will configure and use the speed input as the reference speed for the machine train.

In the Machine train properties window (left), the Reference speed control displays the speed input used as the reference speed for the machine train, if one has been configured.

In the Machine train properties window, the Reference speed control can also be used to delete or change the reference speed, as required.

In VibroSight 7.8.0, the main new feature related to VibroSight Capture and reference speeds is that now, when a reference speed is configured for a machine train, VibroSight Capture will automatically use that reference speed as the speed reference for any signal processing that requires it.

In practice, this means that on the Configure tab/page, where the condition monitoring processing is configured, for any condition monitoring that requires a speed reference, the Reference speed control will automatically be configured to use the reference speed configured for the machine train. For example, Shaft relative vibration, Bearing absolute vibration, Combustion dynamics and Custom dynamic processing.

(Previously, even if a reference speed was configured for the machine train, the Reference speed control(s) still had to be manually configured for each and every condition monitoring processing that required it.)

2.6 VibroSight Capture and non-linear sensors / measurement chains

In VibroSight Capture, it is now possible to configure a sensor / measurement chain with a non-linear sensitivity curve / characteristic.

More specifically, a range of non-linear sensors / measurement chains can now be configured for the "Temperature sensors" family as used by the Quasi-static temperature processing, and for the "Other sensors" sensor family as used by the Custom dynamic and Custom quasi-static processing.

Linear sensitivities

Previously, it was only possible to configure a sensor / measurement chain with a linear sensitivity curve / characteristic, that is, equivalent to the now default setting of Sensitivity curve: Linear.

With Sensitivity curve set to Linear, the Sensitivity curve is shown as a straight line, and the characteristics of the sensor / measurement chain are defined by using the controls shown in the sensitivity curve to specify the

sensitivity (output (V or I) / physical quantity units) and the linear part of the measurement range (in terms of both output (V or I) and physical quantity units.

Non-linear sensors defined by polynomial coefficients

When working with non-linear sensors defined by polynomial coefficients, it is now possible to configure the Sensitivity curve as Non-linear and define the sensor in terms of polynomial coefficients.

(Previously, it was only possible to configure a sensor / measurement chain with a linear sensitivity curve / characteristic, that is, equivalent to the now default setting of Sensitivity curve: Linear.)

With Sensitivity curve set to Non-linear, the Sensitivity curve is shown as a curved line, and the characteristics of the sensor / measurement chain can be defined in a number of different ways, depending on the sensor type.

For Sensor type(s) Voltage output and Current output, in the sensitivity curve, the drop-down menu is shown as Custom and clicking on the "Sensitivity" control in the curve presents the Non-linear sensitivity window.

In the Non-linear sensitivity window:

- The Electrical unit and Engineering unit controls (top) are used to define the output voltage or current units and the physical quantity units for the sensor / measurement chain.
- The Polynomial coefficients table is used to define the non-linear curve for the sensor / measurement using one to four polynomial curves (where each polynomial will correspond to a specific region of the curve):
  - Each polynomial curve shall be configured providing the input range and the polynomial coefficients.
  - Each polynomial curve can have 1 to 11 coefficients (C_0 to C_{10}), as follows:

    $$Y = G \times (C_0 + C_1X + C_2X^2 + C_3X^3 + ... + C_nX^n)$$

    where

    X is the input (for instance, ohms or volts),

    Y is the output (for instance, temperature),

    Cn are the polynomial coefficients,

    G is the output gain.

NOTE: The user shall be able to configure polynomials of a maximum grade of 10.

- The Add control is used to add additional curves. Alternatively, the Import and Export controls can be used to import / export defined polynomial curves in the CSV (comma separated values) file format, for example using Excel or equivalent.
- The Sensitivity polynomial curve automatically updates to show the non-linear sensitivity of the sensor / measurement chain, as defined by the data entered in the polynomial coefficients table.

Non-linear RTD temperature sensors

When working with non-linear temperature sensors such as RTDs (resistance temperature detector), it is now possible to configure the Sensitivity curve as Non-linear and either use one of the predefined RTD characteristic curves or define a custom characteristic curve (in terms of polynomial coefficients).

With Sensitivity curve set to Non-linear, the Sensitivity curve is shown as a curved line, and the characteristics of the sensor / measurement chain can be defined in a number of different ways, depending on the sensor type.

For RTD Sensor types (2-wire RTD, 3-wire RTD or 4-wire RTD), in the sensitivity curve, the drop-down menu can be used to select one of the following pre-defined types of RTD sensor: PT100-385, PT100-392, CU10-427, NI120-672.

Alternatively, in the sensitivity curve, the drop-down menu can be used to select Custom and the "Sensitivity" control in the curve can be used to define a custom non-linear curve (as described in "Non-linear sensors defined by polynomial coefficients" above).

Non-linear Thermocouple temperature sensors

When working with non-linear temperature sensors such as thermocouples, it is now possible to configure the Sensitivity curve as Non-linear and either use one of the predefined thermocouple characteristic curves or define a custom characteristic curve (in terms of polynomial coefficients).

With Sensitivity curve set to Non-linear, the Sensitivity curve is shown as a curved line, and the characteristics of the sensor / measurement chain can be defined in a number of different ways, depending on the sensor type.

For Thermocouple Sensor types (Thermocouple), in the sensitivity curve, the drop-down menu can be used to select one of the following pre-defined types of Thermocouple sensor: TC type E, TC type J, TC type K, TC type T.

Alternatively, in the sensitivity curve, the drop-down menu can be used to select Custom and the "Sensitivity" control in the curve can be used to define a custom non-linear curve (as described in "Non-linear sensors defined by polynomial coefficients" above).

See also 2.1 Support for the VM600Mk2 AMC10Mk2 + IOC10Mk2 temperature and analog monitoring module.

2.7 VibroSight Capture, axial journal bearings and VM600^{Mk2} MPC4^{Mk2} module shaft axial position processings

In VibroSight Capture, on the Connect tab/page that is used to associate/connect processing blocks/functions to machine train components in order to help organize and visualize the measurements and the machinery being monitored, it is now possible to connect the different types of shaft axial position processing supported by VM600^{Mk2} MPC4^{Mk2} + IOC4^{Mk2} machinery protection and condition monitoring modules to axial journal bearings in a machine train.

More specifically, the following VM600^{Mk2} MPC4^{Mk2} + IOC4^{Mk2} module shaft axial position processings (configured in VibroSight Protect) can now be connected to axial journal bearings (configured in VibroSight Capture):

- Single-channel processing:
  - Shaft axial position (collar (method))
  - Shaft axial position (shaft end (method)).
- Dual-channel processing:
  - Shaft axial position (collar (method))
  - Shaft axial position (shaft end (method)).

NOTE:	In VibroSight Capture, on the Connect tab/page, when a machine train component is selected (top) and a processing channel (single or dual) is selected (bottom), the "Connect" control is displayed if the two are compatible and can be associated/connected. Otherwise, "The processing of a selected input channel is not compatible with the selected machine component" message is displayed.

Note: In a machine train, the number of sensor icons shown against an axial journal bearing reflects the number of sensors used by the associated processing, that is, one for single-channel processing, and two for dual-channel processing.

(Previously, it was not possible to connect the different types of shaft axial position processing supported by the VM600^{Mk2} MPC4^{Mk2} + IOC4^{Mk2} module to axial journal bearings.)

2.8 VibroSight Capture, machine train components and VM600^{Mk2} MPC4^{Mk2} module position processing

In VibroSight Capture, on the Connect tab/page that is used to associate/connect processing blocks/functions to machine train components in order to help organize and visualize the measurements and the machinery being monitored, it is now possible to connect the position processing supported by VM600^{Mk2} MPC4^{Mk2} + IOC4^{Mk2} machinery protection and condition monitoring modules to a wider range of different machine train components in a machine train.

More specifically, the following VM600^{Mk2} MPC4^{Mk2} + IOC4^{Mk2} module processing (configured in VibroSight Protect) can now be connected to a wider range of different machine train components (configured in VibroSight Capture):

- Single-channel processing:
  - Position.

NOTE:	In VibroSight Capture, on the Connect tab/page, when a machine train component is selected (top) and a processing channel (single or dual) is selected (bottom), the "Connect" control is displayed if the two are compatible and can be associated/connected. Otherwise, "The processing of a selected input channel is not compatible with the selected machine component" message is displayed.

The range of different machine train components that position processing can now be connected to includes the following:

- Generic machines: Rectangle, Square, Circle, Trapezoid.
- Steam turbine: Single flow, Double flow, HP-IP.
- Hydro turbine: Francis, Kaplan, Pelton.
- Pump: Centrifugal, Multi-stage.
- Generator: Compact, Large.
- Compressor: Reciprocating 2 throw, Reciprocating 4 throw, Reciprocating 6 throw.
- Bearings: Radial journal bearing, Axial journal bearing.
- Gearbox: Single-stage, Multi-stage.

Note: A previous limitation of one position processing per machine train component was removed so it is now possible to associate/connect multiple position processings with a single machine train component. Accordingly, in a machine train, the number of sensor icons shown against a machine train component reflects the number of associated processings, that is, one for one processing, two for two processings, and so on.

(Previously, it was not possible to connect the position processing supported by the VM600^{Mk2} MPC4^{Mk2} + IOC4^{Mk2} module to such a wide range of different machine train components. And where possible, it was only allowed to connect one position processing per machine train component.)

2.9 VibroSight Capture, steam-turbine machine train components, valve regions and VM600^{Mk2} MPC4^{Mk2} module position processing

In VibroSight Capture, on the Connect tab/page that is used to associate/connect processing blocks/functions to machine train components in order to help organize and visualize the measurements and the machinery being monitored, it is now possible to connect a range of processings supported by VM600^{Mk2} MPC4^{Mk2} + IOC4^{Mk2} machinery protection and condition monitoring modules to new specific "valve regions" of the steam-turbine components in a machine train.

More specifically, the following VM600^{Mk2} MPC4^{Mk2} + IOC4^{Mk2} module processings (configured in VibroSight Protect) can now be connected to these new valve regions of the steam-turbine components (configured in VibroSight Capture):

- Single-channel processing:
    - Position
    - Quasi-static pressure
    - Quasi-static temperature
    - Custom dynamic
    - Custom quasi-static.
- Dual-channel processing:
    - Mathematical function.

NOTE:	In VibroSight Capture, on the Connect tab/page, when a machine train component is selected (top) and a processing channel (single or dual) is selected (bottom), the "Connect" control is displayed if the two are compatible and can be associated/connected. Otherwise, "The processing of a selected input channel is not compatible with the selected machine component" message is displayed.

The range of steam-turbine components with the new valve regions that processings can now be connected to includes the following:

• Single flow
• Double flow
• HP-IP.

In VibroSight Capture, on the Connect tab/page, when connecting a steam-turbine component with valve regions (top) with a compatible processing (bottom), a Processing function location window is now automatically displayed in order to allow the function/position of the sensor icon shown against a steam-turbine component to be assigned to one of the following "regions":

• No specific location
• Control valves
• Stop valves.

In a machine train, when Control or Stop valves regions are used, the sensor icon(s) are now shown against a valves image added to the top of the steam-turbine component, as follows:

• Valves image (general): .

• Control valve: .

• Stop valve: .

Accordingly, in a machine train, when a steam-turbine component with valve regions is used:

• For sensors assigned to No specific location – the sensor icon(s) are shown below the machine component (as before).
• For sensors assigned to Control valves – the sensor icon(s) are shown against the control valve (bottom) in the valves image.
• For sensors assigned to Stop valves – the sensor icon(s) are shown against the stop valve (top) in the valves image.

(Previously, it was not possible to connect processings supported by the VM600^{Mk2} MPC4^{Mk2} + IOC4^{Mk2} module to "valve regions" of steam-turbine components – as valve regions were only introduced in VibroSight 7.8.0.)

2.10   VibroSight and OPC UA NodeIds

The VibroSight software includes support for OPC UA (unified architecture) so that a VibroSight Server can easily export data from a VibroSight Server (VibroSight historical data folder (`*.vshdf`)) to third-party systems such as a DCS, PLC or data analysis tools.

NOTE:	No specific configuration procedure is required in order to use OPC UA with VibroSight, that is, it is not necessary to manually create, save and publish a separate VibroSight OPC server.
	Instead VibroSight automatically creates an OPC UA server for all of the data available in a VibroSight Server (live and historical, static and dynamic) when OPC UA server is enabled in the VibroSight Server user interface (that is, OPC UA server enabled under Server features and OPC / OPC UA enabled under Device drivers) . More specifically, the OPC UA server is embedded in the VibroSight Server (Xms.Server.Client.exe).

OPC UA uses NodeIds – unique identifiers for the nodes in the address space of an OPC UA server. Accordingly, to ensure stability and usability of the OPC UA interface, VibroSight's implementation of OPC UA has recently been improved to ensure that NodeIds (measurements) are more consistent/persistent across restarts and configuration changes.

More specifically, a "persistent dictionary" has been implemented in order to store a stable mapping between measurements and their corresponding OPC UA NodeIds. And the dictionary is reused on each server start to ensure consistent NodeId allocation.

For example, NodeIds for unchanged measurements remain the same across configuration changes, and new measurements are assigned new NodeIds without affecting existing ones. Removed measurements are no longer served via OPC UA, but remaining ones retain their previous NodeIds. Edge cases such as ID collisions, configuration import/export, and recovery from corrupted mappings are also handled.

(Previously, VibroSight's OPC UA NodeIds were generated dynamically each time the OPC UA server started, based on the order of measurements in the configuration. As a result, when a system configuration changed (for example, by adding or removing a measurement in the VibroSight Capture configuration), NodeIds shifted, causing clients to lose access to previously subscribed measurements – which required that their OPC UA client was updated in order to regain access.)

2.11 VM600^Mk2 systems, VibroSight Capture and CSV 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 …

- CSV data source (comma-separated values files) – used for external data file import.

NOTE:	CSV files can be imported into a local VibroSight Server (`*.vshdf`) in order to allow data from third-party systems such as other monitoring systems and/or control systems (DCS or PLC) to be easily incorporated, and take advantage of the speed and power of VibroSight for machinery monitoring, remote monitoring and diagnostics.

NOTE:	A CSV file is a comma-separated values file, that is, a delimited text file text that uses commas to separate values. CSV files are typically used to share (import/export) data between programs that store data in tables, such as databases or spreadsheets.

Data imported from CSV files can be displayed live in VibroSight Vision and/or it can be logged to the VibroSight Server (database). Once imported into a VibroSight Server (VibroSight historical data folder (`*.vshdf`)), data from third-party systems is considered as VibroSight data and is handled and treated in exactly the same way. For example, the data can be displayed and analysed using VibroSight Vision, and so on.

NOTE:	Just like all of the other measurement data available in a VibroSight monitoring system, data imported from CSV files can be logged into a VibroSight Server (database) so that it remains available as historical data − by simply configuring data logging rules for the imported CSV data entities in VibroSight Protect.

Importing data from CSV files into a VibroSight Server (database) is particularly useful when:

- Users are migrating from an existing machinery monitoring system to VibroSight and they want to access the legacy system data using VibroSight.

- Users want to use the speed and power of VibroSight data for the display and analysis and of all of their plant-wide data.

- Users want to centralise data from multiple different systems in a single VibroSight Server (database) for ease of data management.

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

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

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

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

  In the main window (centre), click on the CSV data source icon to select it.
  The CSV 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 CSV data source requires that the following parameters are configured:

  - Enabled, Name, Description, Input directory, Remove CSV files after processing, Remove invalid CSV files, CSV separator, Time zone, File encoding, Timestamp column, Timestamp pattern.

  Where:

  Enabled: A CSV data source is enabled by default but can be disabled, as required.

  Name: Use the default name for the CSV 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 CSV files (for example, `*.csv`) from the third-party system(s). That is, where the CSV data files to be imported will be made available.
  Note: `…\External CSV Files` is the default but can be changed as required. It can be a folder on the computer running the VibroSight Server or a network directory/folder.

  Remove CSV files after processing: When this check box is selected, the VibroSight Server will automatically delete a CSV file from the input folder after it has finished processing it.
  Note: It can be useful to see the CSV files in the input folder when initially configuring and working with a 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 CSV files: When this check box is selected, the VibroSight Server will automatically delete from the input folder any CSV files that are invalid and cannot be processed (for example, corrupted fles).

CSV separator: Select the character used to separate (delimit) the data in the CSV files. Comma is the default.

Time zone: Select the time zone (local computer/site time) used by the timestamps in the CSV files.
UTC (coordinated universal time) is the default.

File encoding: Select the file encoding (character set) used by the CSV files. 65001 : Unicode (UTF-8) is the default.

Timestamp column: Enter the title of the column in the CSV file containing timestamp data. Timestamp is the default.

Timestamp pattern: Enter the syntax of timestamp data used by the CSV files, where:
dd is the day (as a number from 01 through 31; a single-digit day is formatted with a leading zero),
MM is the month (as a number from 01 through 12; a single-digit month is formatted with a leading zero),
yyyy is the year (as a number with a minimum of four digits; if the year has fewer than four digits, the number is padded with leading zeros to produce four digits),
HH is the hour (as a number from 00 through 23, that is, the hour is represented by a zero-based 24-hour clock that counts the hours since midnight; a single-digit hour is formatted with a leading zero),
mm is the minute (as a number from 00 through 59; a single-digit minute is formatted with a leading zero),
ss is the second (as a number from 00 through 59; a single-digit second is formatted with a leading zero).
dd.MM.yyyy HH:mm:ss is the default.

Export CSV template file control:

For a CSV data source, after Tag groups containing the data (tags) to be imported have been configured, a template CSV file corresponding to the configured Tag groups and Tags data structure can be exported in order to be used as a reference for the creation and population of the real CSV files with data that will be imported. This is done using the Export CSV template file control.

- On the Systems tab/page, add Tag groups for data (tags – scalar and/or vector data entities) to the CSV data source interface.

  Note: One or more Tag groups are required to contain/organize the data (tags – scalar and/or vector data entities) that will be imported.

  In the main window (centre), click on Tag group 1 (left) to select it.
  The Tag group parameters are displayed on the General tab in the main window (centre) and can be edited as required.

Configuring a Tag group requires that the following parameters are configured:

- Enabled, Name, Description.

Where:

Enabled: A Tag group is enabled by default but can be disabled, as required.

Name: Use the default name for the Tag group or change it, as required.

Description: Optional text to help describe the Tag group.

Note: At any time, clicking on the CSV data source or Tag group n (System window, right) can be used to select the CSV data source or Tag group to display on the main (home) view of the Systems tab/page.

- On the Systems tab/page, add data (tags – scalar and/or vector data entities) to Tag groups for the CSV data source interface.

  In the main window (centre), click on a Tag group (left) to select it. Alternatively, use the System window (right). For the selected Tag group, the data (tags) parameters are displayed on the Tags tab in the main window (centre) and can be added and configured as required.

  To add data (tags) to the Tag group, use the Add control (bottom left) to add a Scalar data entities and/or a Vector data entities, as required.

  Added data (tags – scalar and/or vector data entities) are displayed on the Tags tab in the main window (centre) where they can be edited.

  Note: In the summary view (left), the Enabled column is used to enable or disable a tag, as required.

  In the main window (centre), select a tag (scalar or vector data entity) in the summary view (left) and configure its parameters (right), as follows:

  Tag name: Use the default tag name for the data entity or change it, as required.

  Quantity: The physical quantity for the data entity (for example, acceleration or velocity or displacement).

  Unit: The unit for the data entity (for example, g or m/s2 when the physical quantity is acceleration).

  Qualifier: The qualifier (rectifier) unit for the data entity (for example, average, RMS or peak).

  Amplitude column: The path name for the amplitude component of a scalar or vector data entity.
  Default is `<Processing block name>\<Data entity name>\Amplitude`, where the 'Processing block name' and 'Data entity name' depend on parameters configured earlier but `Amplitude` can be changed here as required.

  Rotation speed column (optional): If required, the path name for the rotational speed data corresponding to the data entity.

Default is `<Processing block name>\<Data entity name>\Speed`, where the 'Processing block name' and 'Data entity name' depend on parameters configured earlier but 'Speed' can be changed here as required.

Rotation speed unit: The unit for the rotational speed data corresponding to the data entity (rpm or rps).

Quality column (optional): If required, the path name for the data quality information corresponding to the data entity.
Default is `<Processing block name>\<Data entity name>\Quality`, where the 'Processing block name' and 'Data entity name' depend on parameters configured earlier but 'Quality' can be changed here as required.

Minimum value and Maximum value: Values to be used to display the data entity can also be configured.

Alarm: A 1D fixed limit alarm for the data entity can also be configured.

In addition, for a vector data entity only, there are:

Phase qualifier: The phase qualifier (reference) for the phase component of a vector data entity.

Phase column: The path name for the phase component of a vector data entity.
Default is `<Processing block name>\<Data entity name>\Phase`, where the 'Processing block name' and 'Data entity name' depend on parameters configured earlier but 'Phase' can be changed here as required.

Note: When configuring data parameters, the path names are the actual paths to the effective data columns in the CSV files themselves.

Import from CSV and Export to CSV controls:

In the summary view (left), the Import from CSV and Export from CSV controls can be used to more easily add/configure/share data (tags – scalar and/or vector data entities) by using CSV files containing tag data. More specifically, after a CSV data source containing one or more tag groups and tags (scalar and/or vector data entities) has been configured, a template CSV file corresponding to the configured Tag groups and Tags data structure can be exported in order to be used as a reference for the creation and population of the real CSV files with data that will be imported.

- On the Data tab/page, under Database logging rules, configure the data logging rules for the VibroSight Server in the usual way.

  Note: If data logging rules are not configured for the data imported from the CSV data source, then the data will be available as live data only.

- On the Data tab/page, under Database backup, Database purge and File storage, configure the integrated data management for the VibroSight Server in the usual way.

A VibroSight Capture configuration with CSV data source import 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 (CSV import) must be enabled via the server's user interface, as appropriate.

Application tips and tricks

Use the exported CSV data template file (Import from CSV and Export from CSV controls) as a reference for the creation and population of the real CSV files with data that will be imported into VibroSight.

The optimal Tag groups and Tags structure used to import data from CSV files into VibroSight depends primarily on the application and the third-party data source or sources being used.

For example:

- A single CSV file, containing both scalar and vector data, could be used for each separate time period to be imported.

- Different CSV files, one containing scalar data and one containing vector data, could be used for each separate time period to be imported.

- Different CSV files, containing scalar and/or vector data for a particular machine or process, could be used for each time separate time period to be imported.

However, there is one very important condition to observe when importing data from CSV files into VibroSight, namely, that the data must be made available in a strict chronological order. More specifically:

- In the CSV files themselves, the timestamps (and data) must be in a chronological order. For example:

```
Timestamp,Processing Block 1\Scalar Data Entity 1\Amplitude,…

17.09.2018 14:05:30,10,…

17.09.2018 14:06:30,15,…

17.09.2018 14:07:30,13,…

17.09.2018 14:08:30,20,…

…
```

- The CSV files themselves must be copied to the Input directory (default: …\External CSV Files) in chronological order. That is, CSV files containing data with earlier timestamps must be made available and imported before CSV files containing data with later timestamps.

NOTE:	When importing data from CSV files into VibroSight, it is important to important to make the data available in a strict chronological order.
	This is because VibroSight Server keeps track of the latest (most recent) timestamp for each individual data entity and will not allow data earlier than the latest (most recent) timestamp to be imported

In the VibroSight Server user interface:

- On the Status tab, under Server features, ensure that CSV import is enabled.

- On the Status tab, under Server features, ensure that Data logging manager is enabled if the VibroSight Server is required to log data (including CSV data source data) to its database.

Note: If the VibroSight Server is to be used for the display of live data only, then data logging is not required.

Once a configuration is activated (applied) to a VibroSight Server and CSV import and Data logging manager are enabled, the VibroSight Server is ready to start the import and collation of data from CSV files.

Note: For the VibroSight Server, the data update rate depends on the availability of the CSV files (for example, `*.csv`) in the input folder monitored by the VibroSight Server.

In practice, a VibroSight Server continuously monitors the designated directory/folder (Input directory) for the CSV files (for example, `*.csv`). As the files appear in the designated directory/folder, the VibroSight Server uses the timestamps of the files to help organise and sort them before parsing the files and adding the CSV data to its own database (VibroSight historical data folder (`*.vshdf`)).

The VibroSight Server's Log messages tab is used to display any messages related to the import of data from CSV files into VibroSight, such as problems processing CSV files due to missing or incorrectly formatted data.

In VibroSight Vision:

- Create a new project (File > New project) using VibroSight Server as the data source, then select and connect to the VibroSight Server.

- Use the Time range window to work with live (Live data) or historical (Machine states, Alarms or Custom historical) data, as required.

When working with live data, the update rate for the data displayed in a plot depends primarily on how often the CSV files are copied to the input folder monitored by the VibroSight Server.

When working with historical data, the data displayed in a plot depends primarily on the availability of the imported data in the VibroSight historical data folder (`*.vshdf`) used as the data repository by the VibroSight Server (which in turn depends on how often CSV files (for example, `*.csv`) are copied to the input folder monitored by the VibroSight Server and the contents of the CSV files.

For example, for CSV files covering a time range of 10 minutes that are regularly imported (approximately every 10 minutes), a historical data plot would display the most recent data in 10 minute "chunks".

2.12 MPC4^{Mk2} + IOC4^{Mk2} module hardware (standard and SIL versions)

The MPC4^{Mk2} + IOC4^{Mk2} machinery protection and condition monitoring module and the RLC16^{Mk2} relay module are available in different versions – standard and SIL – as follows:

- MPC4^{Mk2} + IOC4^{Mk2} and RLC16^{Mk2} – these are the standard versions of the modules, suitable for most applications.
  Note: PNRs 600-041 for the MPC4^{Mk2}, 600-043 for the IOC4^{Mk2} and 600-045 for the RLC16^{Mk2}.

- MPC4^{Mk2} + IOC4^{Mk2} SIL and RLC16^{Mk2} SIL – these are the SIL safety versions of the modules, suitable for critical applications demanding the highest level of protection.
  Note: PNRs 600-040 for the MPC4^{Mk2} SIL, 600-042 for the IOC4^{Mk2} SIL and 600-044 for the RLC16^{Mk2} SIL.

NOTE: It is important to note that the standard (STD) and SIL versions of the VM600^{Mk2} MPC4^{Mk2} + IOC4^{Mk2} modules use different firmwares, as follows:

MPC4^{Mk2}:
(STD) Machinery protection firmware: 640-025-vvv-pp
(STD) Condition monitoring firmware: 640-033-vvv-ppp
(STD) Recovery firmware: 640-031-vvv-ppp
Protection test firmware: 640-032-vvv-ppp.

MPC4^{Mk2} SIL:
SIL machinery protection firmware: 640-024-vvv-ppp
SIL condition monitoring firmware: 640-033-vvv-ppp
SIL Recovery firmware: 640-026-vvv-ppp
Protection test firmware: 640-032-vvv-ppp.

The condition monitoring firmware (640-033-vvv-ppp) is intended to be common/shared firmware that is used by both the STD and SIL versions of the VM600^{Mk2} MPC4^{Mk2} + IOC4^{Mk2} modules. However, due to differences in release schedules and because of SIL certification requirements, in practice, it's often not possible to introduce new features while maintaining full compatibility between the two modules (and firmwares).
For example, the latest condition monitoring firmware (640-033-008-ppp, version 8.0) introduces a new interface with features that are only available on the standard version of the module. But the SIL version of the module still operates with the older interface and so continues to use the previous condition monitoring firmware (640-033-007-ppp, version 7.0).

Please note that the protection test firmware (640-032-vvv-ppp) is common/shared firmware that is used by both the STD and SIL versions of the VM600^{Mk2} MPC4^{Mk2} + IOC4^{Mk2} modules.

See also 2.13 MPC4^{Mk2} + IOC4^{Mk2} module firmware and 2.14 MPC4^{Mk2} + IOC4^{Mk2} SIL module firmware.

2.13 MPC4^{Mk2} + IOC4^{Mk2} module firmware (standard)

NOTE:	Standard versions of firmware are for use with the MPC4^{Mk2} + IOC4^{Mk2} module only (that is, PNR 600-041 for the MPC4^{Mk2}).

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

(STD) Machinery protection firmware: 640-025-012-000

NOTE:	VM600^{Mk2} MPC4^{Mk2} machinery protection firmware (640-025-012-000) is compatible with both versions of the MPC4^{Mk2} module (PNRs 600-041-000-vvv and 600-041-001-vvv).

New features:

- A watchdog timer causes the module to reboot/restart if the machinery protection firmware stops operating normally.

- The status of all discrete signal interface (DSI) inputs (alarm bypass (AB), alarm reset (AR) and trip multiply (TM)) is reported to a VM600^{Mk2} CPUM^{Mk2}, via the VME bus.

- Overall module status (diagnostic fault code information) is reported to a VM600^{Mk2} CPUM^{Mk2}, via the VME bus.

- The alarm bypass (AB) DSI input can be used as an input to a logical function or a relay.
  Note: The DSI alarm bypass (the physical contact) is applied to all channels at the same time.

- For frequency domain measurements, it is possible to configure the measurements in terms of orders (nX) when using fixed-frequency data acquisition, and to configure the measurements in terms of frequency (Hz) when using order-tracking data acquisition.

- Single-channel temperature sensor processing (quasi-static temperature) supports averaging (specifically, mean, minimum or maximum).
  Note: The VM600^{Mk2} MPC4^{Mk2} module and VM600^{Mk2} AMC8^{Mk2} module both support temperature averaging in the same way.

- The average reference speed is now included/provided with all frequency-domain or time-domain measurements (waveforms) sent to VibroSight.
  Note: Previously, the instantaneous speed was included/provided which could result in plot errors when using doubly-integrated measurement data.

- Support for the remote unlocking (with password protection) of a module via an "unlock" control in the VibroSight software.

- Adaptive monitoring improvement to correctly handle certain physical quantities, notably temperature configured in degrees Celsius (°C).

- For dual-taper processings (differential expansion and rotor expansion), the ramp angle (α_1 and α_2) constraints have been modified.

Bug fixes:

- Added support for dates and times in the year 2038 and beyond (timestamp data type / operating system issue, known as the year 2038 problem and/or Y2K38).

- Handling, storage and use of IP address, subnet mask and default gateway addresses.

- For differential expansion (collar) processing, the dual sensor OK check (sensor NOK) was not working correctly for this dual-channel processing.

- Module stopped operating normally (crashed) when the NTP server time changed significantly, that is, with large jumps in time.

- Module erased its configuration upon detection of an error class 1 (fatal-level) or 2 (error-level) diagnostic fault code during module boot / power-on self-test (POST).

Restrictions:

- Compatible with VibroSight 7.8 only.

(STD) Condition monitoring firmware: 640-033-008-000

New features:

- For frequency domain measurements, it is possible to configure the measurements in terms of orders (nX) when using fixed-frequency data acquisition, and to configure the measurements in terms of frequency (Hz) when using order-tracking data acquisition.

- The average reference speed is now included/provided with all frequency-domain or time-domain measurements (waveforms) sent to VibroSight.
  Note: Previously, the instantaneous speed was included/provided which could result in plot errors when using doubly-integrated measurement data.

- Added support for a third dual-processing channel (in order to help support quad-channel processing such as journal bearing vibration ("sleeve bearing vibration") in VibroSight).

Bug fixes:

- Dual-channel data for dynamic channels was returned when data for auxiliary channels was requested (depending on the configuration).

- Shaft absolute vibration processing, which uses shaft relative vibration processing and bearing absolute vibration processing, only accepted velocity sensors or velocimeters (requiring single integration) – but will now also work with accelerometers (requiring double integration).

- Shaft absolute vibration processing failing due to lack of synchronisation between the constituent shaft relative vibration processing and bearing absolute vibration processing, related to the different levels of integration (1 or 2) of the sensor / measurement channel vibration signal that can be required.

Restrictions:

- Compatible with the latest (STD) machinery protection firmware (640-025-012-000) and VibroSight 7.8 only.

(STD) Recovery firmware: 640-031-008-000

New features:

- Support for the remote unlocking (with password protection) of a module via an "unlock" control in the VibroSight software.

Bug fixes:

- Added support for dates and times in the year 2038 and beyond (timestamp data type / operating system issue, known as the year 2038 problem and/or Y2K38).

- Handling, storage and use of IP address, subnet mask and default gateway addresses.

- Module stopped operating normally (crashed) when the NTP server time changed significantly, that is, with large jumps in time.

Restrictions:

- Compatible with VibroSight 7.8 only.

Protection test firmware: 640-032-005-000

NOTE:	Please note that the protection test firmware (640-032-vvv-ppp) is the only firmware common/shared by the STD and SIL versions of the VM600^{Mk2} MPC4^{Mk2} + IOC4^{Mk2} modules.

New features:

- None.

Bug fixes:

- Added support for dates and times in the year 2038 and beyond (timestamp data type / operating system issue, known as the year 2038 problem and/or Y2K38).

Restrictions:

- Compatible with the latest (STD) recovery firmware (640-031-008-000), the latest SIL recovery firmware (640-026-003-000) and VibroSight 7.8 only.

See also 6.2 VM600^{Mk2}/VM600 modules (cards).

2.14 MPC4^{Mk2} + IOC4^{Mk2} SIL module firmware (SIL)

NOTE:	SIL versions of firmware are for use with the MPC4^{Mk2} + IOC4^{Mk2} SIL module only (that is, PNR 600-040 for the MPC4^{Mk2} SIL).

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

SIL machinery protection firmware: 640-024-002T005

New features:

• None.

Bug fixes:

• Added support for dates and times in the year 2038 and beyond (timestamp data type / operating system issue, known as the year 2038 problem and/or Y2K38).

• Handling, storage and use of IP address, subnet mask and default gateway addresses.

• Module stopped operating normally (crashed) when the NTP server time changed significantly, that is, with large jumps in time.

• Module sometimes entered fail-safe mode (safe state) after a power off/on cycle (module boot / power-on self-test (POST)).

• Module sometimes entered recovery mode (safe state) after a power off/on cycle (module boot / power-on self-test (POST)) and invalidated the module's configuration.

• Module sometimes does not provide data after a power off/on cycle (module boot / power-on self-test (POST)) in the unlocked operational mode (maintenance mode), due to an internal (SVP) synchronisation issue.

• Tacho diagnostics improvements in order to avoid false alarms (that is, tacho related diagnostic fault codes). For example, due to how equal signal inputs on both auxiliary channels are characterised in terms of input level sensitivity and pulse signal steepness, and/or due to input DC offset changes larger than the tacho signal amplitude.

Restrictions:

• Compatible with VibroSight 7.8 only.

NOTE: It is important to be aware that this latest SIL machinery protection firmware, 640-024-002T005, is a "beta" release for the future 640-024-002-000 and is intended for test and evaluation only. SIL re-certification is *pending!*

(Note: 640-024-002T005 also includes the changes from 640-024-002T002 and 640-024-002T003, which corresponds to all changes that will be available in the future 640-024-002-000 – compared to the last official release 640-024-001-000.)

Since this latest SIL machinery protection firmware (640-024-002T005) is a "beta" release, the MPC4^{Mk2} SIL module cannot be Locked (that is, cannot be put into the safety/secure operating mode (of the Operational mode)).

Firmware upgrades to final versions of SIL-specific firmware will be required before a VM600^{Mk2} SIL system containing MPC4^{Mk2} + IOC4^{Mk2} SIL modules can be used in critical safety-related applications.

(SIL) Condition monitoring firmware: 640-033-007-001

New features:

- For frequency domain measurements, it is possible to configure the measurements in terms of orders (nX) when using fixed-frequency data acquisition, and to configure the measurements in terms of frequency (Hz) when using order-tracking data acquisition.

- The average reference speed is now included/provided with all frequency-domain or time-domain measurements (waveforms) sent to VibroSight.
  Note: Previously, the instantaneous speed was included/provided which could result in plot errors when using doubly-integrated measurement data.

- Added support for a third dual-processing channel (in order to help support quad-channel processing such as journal bearing vibration ("sleeve bearing vibration") in VibroSight).

Bug fixes:

- Dual-channel data for dynamic channels was returned when data for auxiliary channels was requested (depending on the configuration).

- Shaft absolute vibration processing, which uses shaft relative vibration processing and bearing absolute vibration processing, only accepted velocity sensors or velocimeters (requiring single integration) – but will now also work with accelerometers (requiring double integration).

- Shaft absolute vibration processing failing due to lack of synchronisation between the constituent shaft relative vibration processing and bearing absolute vibration processing, related to the different levels of integration (1 or 2) of the sensor / measurement channel vibration signal that can be required.

Restrictions:

- Compatible with the latest SIL machinery protection firmware (640-024-002T005) and VibroSight 7.8 only.

SIL recovery firmware: 640-026-003-000

New features:

- None.

Bug fixes:

- Added support for dates and times in the year 2038 and beyond (timestamp data type / operating system issue, known as the year 2038 problem and/or Y2K38).

- Handling, storage and use of IP address, subnet mask and default gateway addresses.

- Module stopped operating normally (crashed) when the NTP server time changed significantly, that is, with large jumps in time.

Restrictions:

- Compatible with VibroSight 7.8 only.

Protection test firmware: 640-032-005-000

NOTE:	Please note that the protection test firmware (640-032-vvv-ppp) is the only firmware common/shared by the STD and SIL versions of the VM600^{Mk2} MPC4^{Mk2} + IOC4^{Mk2} modules.

New features:

- None.

Bug fixes:

- Added support for dates and times in the year 2038 and beyond (timestamp data type / operating system issue, known as the year 2038 problem and/or Y2K38).

Restrictions:

- Compatible with the latest (STD) recovery firmware (640-031-008-000), the latest SIL recovery firmware (640-026-003-000) and VibroSight 7.8 only.

See also 6.2 VM600^{Mk2}/VM600 modules (cards).

2.15 AMC10^{Mk2} + IOC10^{Mk2} module hardware

The VM600^{Mk2} AMC10^{Mk2} + IOC10^{Mk2} temperature and analog monitoring module is available in one (standard) version, as follows.

- VM600^{Mk2} AMC10^{Mk2} + IOC10^{Mk2}.
  Note: PNR 600-059 for the AMC10^{Mk2} and 600-061 for the IOC10^{Mk2}.

2.16 AMC10^{Mk2} + IOC10^{Mk2} module firmware

New VM600^{Mk2} AMC10^{Mk2} + IOC10^{Mk2} temperature and analog monitoring module firmware to support the initial launch of this new module:

Machinery protection firmware: 640-040-001-000

New features:

- Initial release to support new module.

Bug fixes:

- None.

Restrictions:

- Compatible with VibroSight 7.8 only.

Condition monitoring firmware: 640-042-001-000

New features:

- Initial release to support new module.

Bug fixes:

- None.

Restrictions:

- Compatible with VibroSight 7.8 only.

Recovery firmware: 640-038-001-000

New features:

- Initial release to support new module.

Bug fixes:

- None.

Restrictions:

- Compatible with VibroSight 7.8 only.

Protection test firmware: 640-041-001-000

New features:

- Initial release to support new module.

Bug fixes:

- None.

Restrictions:

- Compatible with VibroSight 7.8 only.

See also 6.2 VM600^{Mk2}/VM600 modules (cards).

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

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

Base-system / Applications firmware: base-system-640-034-006-000

New features:

- Support for new VM600^{Mk2} AMC10^{Mk2} + IOC10^{Mk2} temperature and analog monitoring module added.

- Support for GOOSE (IEC 61850) fieldbus communications interface/protocol added.

Bug fixes:

- Some exceptions not being properly handled, resulting in corrupted messages being printed / logged.

Restrictions:

- Compatible with VibroSight 7.8 or later.

See also 6.2 VM600^{Mk2}/VM600 modules (cards).

VibroSmart modules

2.18VSI010 + VSB010 module firmware

Updated VibroSmart VSI010 + VSB010 communications interface module firmware with the following main improvements:

642-002-000-017

Bug fixes:

- GOOSE (IEC 61850) register addresses incorrectly parsed as hexadecimal when they were decimal (integers).

- PROFINET MAC address sent to netX communications interface (chip) could be incorrect due to a bug in hexadecimal to decimal conversion (library function).

New features:

- None.

Restrictions:

- Compatible with VibroSight 7.8 or later.

See also 6.3 VibroSmart devices.

3 Functional safety

This section of the release notes highlights important information required to use a VM600^{Mk2} machinery monitoring system as a machinery protection system (MPS) in a safety-related application (functional safety context), in accordance with the IEC 61508 "functional safety" standard.

That is, this section is related to the SIL safety versions of the modules, suitable for critical applications demanding the highest level of protection:

- VM600^{Mk2} MPC4 ^{Mk2} + IOC4 ^{Mk2} SIL machinery protection and condition monitoring module.
  Note: PNRs 600-040 for the MPC4^{Mk2} SIL, 600-042 for the IOC4^{Mk2} SIL.

- VM600 ^{Mk2} RLC16 ^{Mk2} SIL relay module.
  Note: PNR 600-044 for the RLC16^{Mk2} SIL.

3.1 VibroSight 7.8.x and functional safety

The VibroSight 7.8.0 software incorporates new firmware(s) for the VM600^{Mk2} MPC4 ^{Mk2} + IOC4 ^{Mk2} SIL machinery protection and condition monitoring module.

Accordingly, please refer to the following sections in the software release notes:

- 2.12 MPC4^{Mk2} + IOC4^{Mk2} module hardware (standard and SIL versions)

- 2.14 MPC4^{Mk2} + IOC4^{Mk2} SIL module firmware (SIL)

- 6.2 VM600^{Mk2}/VM600 modules (cards)

- 7.2.1 VM600^{Mk2}/VM600 module/card firmware.

4 Solved problems and bug fixes

4.1 General improvements and bug fixes

General stability improvements and bug fixes across the VibroSight 7.8.0 software.

4.2 Problems working with large system racks with a lot of modules

Under certain circumstances, when working with large system racks (VM600^{Mk2}/VM600 ABE04x – 6U) with more complicated configurations (lots of modules), it was sometimes not possible to open the configuration and/or activate the configuration.

4.3 VibroSight Vision problem connecting to a server and displaying table plots

For a VibroSight Vision project using a Table plot to display live data from a VibroSight Capture server, after restarting VibroSight Vision and reopening the project, Vision could not automatically reconnect to the server and could not automatically display/update the data in the plot (even though the VibroSight Vision project was saved).

A similar problem was also seen with VibroSight Mimic (also used to display live data).

4.4 VibroSight Capture problem configuring offsets for a VM600^{Mk2} XMx16 module

In VibroSight Capture, when trying to configure an offset for the sensor / measurement chain of a measurement channel of a VM600^{Mk2}/VM600 XMx16 + XIO16T extended condition monitoring module, it was not possible to enter a decimal value. For example, it was possible to enter 12 but not 12.34.

4.5 VibroSight applications problem when connecting to devices

In VibroSight applications such as VibroSight Event Viewer, VibroSight Mimic or VibroSight Vision, when trying to connect to a device (data source type), the applications log file logged (recorded) multiple error messages related to a controller that cannot be found for event entities.

For example:
```
"ERROR … Client.DataInterfaces.Devices.DeviceSubDataInterface … No provider found for
the entity User Event# …"
```

4.6 VibroSight Server problem parsing an event

For a VibroSight Server running a system with VM600^{Mk2} MPC4^{Mk2} + IOC4^{Mk2} machinery protection and condition monitoring modules, there was a problem characterised by an MPC4^{Mk2} module reporting an error while parsing an event (id: 0x00030005) and the Server dashboard displaying full capacity "server memory usage" even though less than half of the computer's available RAM memory was being used (≈20 GB out of 64 GB).

4.7 VibroSight Scope problem displaying vibration signals for a VibroSmart VSV30x module

In VibroSight Scope, when trying to display the measurements from a VibroSmart VSV30x + VSB300 monitoring module configured with two Narrow band vibration processing blocks, VibroSight Scope would only display a measurement for one of the processing blocks.

In fact, this "problem" was traced back to the fact that the VibroSmart VSV30x module's two Narrow band vibration processing blocks were both configured to use the same reference speed (tacho processing block), which is not allowed.

NOTE:	Narrow-band vibration (NB) is an order-tracked measurement and requires a tachometer input (1/rev) in order to track rotational speed. For a VibroSmart VSV30x + VSB300 monitoring module, each Narrow band vibration processing block requires its own dedicated tacho processing block.

Accordingly, the VibroSight Configurator's Consistency Check has been updated to include just such a consistency check and an appropriate message in order to inform the user that "using the same speed for 2 different narrow band processing blocks is not allowed".

4.8 Labelling of magnetic-flux measurements from the Hydro air-gap monitoring package

In VibroSight, the magnetic-flux measurements from the Hydro air-gap monitoring package used the same labelling as the air-gap measurements, making it difficult to distinguish between the two different types of measurement (flux versus gap) when analysing data. That is, the magnetic-flux measurements per pole were named "Gap P1" to "Gap Pn" (exactly the same as the air-gap measurements per pole).

Accordingly, VibroSight Protect has been updated to now use the names "Flux P1" to "Flux Pn" for magnetic-flux measurements.

4.9 VibroSight Protect Dashboard not suggesting a system activation after a configuration change

In VibroSight Protect, after using the Configure tab/page to make certain changes related to the configuration of a VM600^{Mk2} MPC4^{Mk2} module's relays and/or analog outputs, and then going directly to the Dashboard tab/page, the Dashboard did not detect that there were configuration changes and suggest that the system should be reactivated.

More specifically, the Dashboard did not automatically detect that the active configuration on the modules (devices) no longer matched the configuration in VibroSight Protect (file) and suggest a system activation, as required.

4.10 VibroSight Protect problem when changing the physical quantity of a sensor / measurement chain to volumetric flow rate

In VibroSight Protect, when editing/updating the configuration of a VM600^{Mk2} MPC4^{Mk2} module's measurement channel (that is, the input sensor / measurement chain configuration) for a channel that had already been configured with alarms enabled, and then changing the measurement's physical quantity to volumetric flow rate (default unit: m^3/s), VibroSight Protect could stop working normally (that is, crash with an exception error).

4.11 VibroSight Protect problem when configuring a GOOSE (IEC 61850) fieldbus communications interface for a VibroSmart VSI010 module

In VibroSight Protect, after configuring a communications interface of a VibroSmart VSI010 + VSB010 communications interface module to use the GOOSE (IEC 61850) fieldbus communications interface/protocol to export/share data from a VibroSmart VSB30x + VSB300 monitoring module, the Machinery view of Published measurements was not correct.

More specifically, in the list of Published measurements displayed, the first measurement assigned is incorrectly repeated for all measurements (rather than listing the different measurements that were assigned/configured).

5 Known issues

5.1 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 have recently implemented a fix. However the improved UPC UA library is not included in the latest release of VibroSight.

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.

5.2 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.

5.3 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.

5.4 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.

5.5 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).

5.6 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.

5.7 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.

5.8 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.

5.9 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).

5.10 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.

5.11 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.

5.12 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 run.

NOTE:	The VibroSight software's TCP and UDP port requirements are described in detail in the "Software installation" section of the latest 📄 *Getting started with VibroSight installation guide*. See section *4. After installing VibroSight*.

5.13 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.

6   Compatibility

The VibroSight 7.x.x software has certain prerequisite software that must be available on the computer before VibroSight can be installed and/or run.

Accordingly, 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 .NET Framework must either be manually installed by the user or can be automatically installed by the VibroSight installer if it is not detected, depending on the particular version of VibroSight (see section 6.1.2).

- The required Microsoft Visual C++ Redistributable Package is automatically installed by the VibroSight installer if it is not detected (see section 6.1.3).

- The required OPC Core Components Redistributable software is automatically installed by the VibroSight installer if it is not detected (see section 6.1.4).

- The required OPC UA Local Discovery Server software is automatically installed by the VibroSight installer if it is not detected (see section 6.1.5).

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.

6.1 VibroSight software

VibroSight 7.8.0 is a minor level release and replaces VibroSight 7.7.x.

Compatibility with existing VibroSight data repositories (databases) is achieved by automatically applying an internal data migration process from existing VibroSight databases (VibroSight historical data folders (*.vshdf) and/or VibroSight historical data archives (*.vshda)), if and when required.

NOTE:	Since VibroSight 7.4.0, it is no longer possible to migrate older machinery monitoring projects using Sybase SQL Anywhere databases to VibroSight historical data repositories.
	In order to migrate such older projects using Sybase SQL Anywhere databases to VibroSight historical data repositories, VibroSight 7.3.x or earlier (also VibroSight 3.x.x or later) must be used.

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.

- For existing machinery monitoring projects using VibroSight historical data repositories, the VibroSight historical data repositories are automatically updated if and when required (for example, to support new features).

- For existing machinery monitoring projects using Sybase SQL Anywhere databases (that is, created with versions of VibroSight earlier than VibroSight 3.0.0), the project must be manually migrated from Sybase SQL Anywhere databases to VibroSight historical data repositories.

  Note: This data migration must be done using VibroSight 7.3.x or earlier (also VibroSight 3.x.x or later) – before they can be used with VibroSight 7.x.x (also 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 7.3.x or earlier (also VibroSight 3.x.x or later) is described in detail in the "Data migration" section of the *Getting started with VibroSight installation guide*
(Note: For example, using the VibroSight 7.3.x software – see the earlier version of the installation guide: version 33.)

The manual migration of a VibroSight OPC server is described in detail in the "VibroSight OPC Server migration" sections of the latest
 Getting started with VibroSight installation guide
(Note: For example, using the VibroSight 7.4.x software – see the earlier version of the installation guide: version 34.)

6.1.1 Microsoft Windows operating systems

Since VibroSight 7.4.0, the VibroSight software is available as a single version: VibroSight ("VibroSight_64_bit"), which is 64-bit software ("x64 native") optimised to run on 64-bit versions of Microsoft ® Windows ® operating systems. (Previously, the VibroSight software was available as 64-bit or 32-bit software.)

NOTE: The 64-bit version of VibroSight can be installed on 64-bit Microsoft ® Windows ® computers only.

Only a single version of VibroSight can be installed and exist on a computer at any one time.

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

6.1.2 Microsoft .NET Framework

The required version of Microsoft .NET depends on the particular version of VibroSight.

For VibroSight 7.8.x, the required versions of Microsoft .NET are:

- .NET 8.0 Desktop Runtime (v8.0.20) - Windows x64 installer or later
  ("windowsdesktop-runtime-8.0.20-win-x64.exe")

  and

- ASP.NET Core 8.0 Runtime (v8.0.20) - Windows x64 installer or later
  ("aspnetcore-runtime-8.0.20-win-x64.exe").

NOTE: For information on the Microsoft .NET requirements for other versions of VibroSight, see the appendix of this installation guide and the latest

📄 *Getting started with VibroSight installation guide*.

If the required Microsoft .NET is not already installed on the computer that will run VibroSight, then it must be installed manually by the user using one of Microsoft's .NET installers. For example, available from microsoft.com (https://dotnet.microsoft.com/en-us/download/dotnet/8.0).

Refer to the latest 📄 *Getting started with VibroSight installation guide* for further information.

6.1.3 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.

If the required Microsoft Visual C++ Redistributable Package is not pre-installed, then the VibroSight installer will detect this and automatically install it as part of the VibroSight software installation process.

Refer to the latest 📄 *Getting started with VibroSight installation guide* for further information.

6.1.4 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.

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 process.

Refer to the latest 📄 *Getting started with VibroSight installation guide* for further information.

6.1.5   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.

6.1.6   Sybase SQL Anywhere 11 software

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

Since VibroSight 7.4.0, it is no longer possible to migrate older machinery monitoring projects using Sybase SQL Anywhere databases to VibroSight historical data repositories.

For further information on VibroSight and Sybase SQL Anywhere, including the manual migration of older projects using Sybase SQL Anywhere to VibroSight, refer to VibroSight 7.3.x or earlier release notes and/or installation guide.

See also 6.1 VibroSight software.

6.1.7   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.

6.1.8   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.

6.2 VM600^{Mk2}/VM600 modules (cards)

6.2.1 Module (card) firmware

There are some firmware upgrades for VM600^{Mk2}/VM600 modules (cards) corresponding to VibroSight 7.8.0.

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

- Machinery protection: `640-025-012-000.Mpc4g2Fw` (updated)

- Condition monitoring: `640-033-008-000.VxeFw` (updated)

- Recovery: `640-031-008-001.Mpc4g2Fw` (updated)

- Protection test: `640-032-005-000.VxeFw` (updated).

See 2.12 MPC4^{Mk2} + IOC4^{Mk2} module hardware (standard and SIL versions) and 2.13 MPC4^{Mk2} + IOC4^{Mk2} module firmware (standard).

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

- Machinery protection: `640-024-002T005.SafeMpc4g2Fw` (updated)

- Condition monitoring: `640-033-007-001.VxeFw` (updated)

- Recovery: `640-026-003-000.SafeMpc4g2Fw` (updated)

- Protection test: `640-032-005-000.VxeFw` (updated).

See 2.12 MPC4^{Mk2} + IOC4^{Mk2} module hardware (standard and SIL versions) and 2.14 MPC4^{Mk2} + IOC4^{Mk2} SIL module firmware (SIL).

The latest firmware (initial release) for the VM600^{Mk2} AMC10^{Mk2} module is:

- Machinery protection: `640-040-001-000.Amc10Fw`

- Condition monitoring: `640-042-001-000.VxeFw`

- Recovery: `640-038-001-000.Amc10Fw`

- Protection test: `640-041-001-000.VxeFw`.

See 2.15 AMC10^{Mk2} + IOC10^{Mk2} module hardware and 2.16 AMC10^{Mk2} + IOC10^{Mk2} module firmware.

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

- Base-system: `base-system-640-034-006-000.tgz` (updated).

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

The latest firmware for the VM600 CPUR2 card remains:

- Applications: `applications-640-015-001-007.tgz`
- Base-system : `base-system-640-014-001-007.tgz`.

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`.

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

- Applications: `applications-640-010-001-018.tgz`
- Base-system: `base-system-640-003-001-018.tgz`.

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

6.3 VibroSmart devices

6.3.1 Module firmware

There are some firmware upgrades for VibroSmart modules and devices corresponding to VibroSight 7.8.0.

The latest firmware for the VSV30x module remains:

- `642-001-000-022.xtranfw.`

The latest firmware for the VSI010 module is now:

- `642-002-000-017.xmsifw` (updated).

See 2.18 VSI010 + VSB010 module firmware.

The latest firmware for the VSN010 device remains:

- `642-004-000-013.redboxfw.`

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

7 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:	Before starting a VibroSight system update, it is strongly recommended to verify the version of firmware(s) running on the related hardware (VM600^{Mk2}/VM600 and/or VibroSmart modules/devices) in order to establish if any firmware changes/upgrades are also required. See 7.2.3 Updating the firmware using VibroSight System Manager.

IMPORTANT NOTE:	Before upgrading the firmware of any of the hardware (VM600^{Mk2}/VM600 and/or VibroSmart modules/devices) used in a VibroSight system, it is strongly recommended to ensure that a copy of the configuration for the system is available – in case it is necessary to reconfigure the system after the upgrade. See 7.2.3 Updating the firmware using VibroSight System Manager.

7.1 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.

7.2 Updating VibroSight-compatible hardware

Appropriate files and tools are included in the installation package to allow VM600^{Mk2}/VM600 and/or VibroSmart modules/devices to be upgraded to the latest firmware, in order to take advantage of improvements to the VibroSight software.

NOTE:	Updating the firmware for VM600^{Mk2}/VM600 and/or VibroSmart modules/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. It is therefore strongly recommended to change the firmware of VibroSight-compatible hardware only when it is necessary. For example, when the devices must be updated to be compatible with a VibroSight software upgrade.
	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.

IMPORTANT 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.

For example, 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).

7.2.1 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 MPC4 Mk2 subfolder contains the firmware components for use by the MPC4^{Mk2} module (standard versions) and the MPC4 Mk2 SIL subfolder contains the firmware components for use by the MPC4^{Mk2} SIL module (SIL versions). Any additional firmware updates received from parker Meggitt (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) for later versions of the MPC4^{Mk2} (PNRs 600-041-001-002 and 600-041-000-002).

Table 2 shows the compatibility between VibroSight software and VM600^{Mk2} MPC4^{Mk2} module hardware (that is, MPC4^{Mk2} firmware) for the original version of the MPC4^{Mk2} (PNR 600-041-000-001) – no longer supported. See 2.12 MPC4^{Mk2} + IOC4^{Mk2} module hardware.

Table 3 shows the compatibility between VibroSight software and VM600^{Mk2} MPC4^{Mk2} SIL module hardware (that is, MPC4^{Mk2} SIL firmware).

IMPORTANT NOTE:	When changing (upgrading) all firmware components on a VM600^{Mk2} MPC4^{Mk2} module, the module must be in the Recovery mode in order to change the protection test firmware.
	It is important to note that entering the Recovery mode clears the modules configuration, which means that the module (system) must be reconfigured after leaving the Recovery mode – before normal system operation can be resumed.
	Accordingly, it is strongly recommended to ensure that a copy of the configuration for the system is available before upgrading a system. For example, the VibroSight software can be used to connect to a system (which will automatically read/download the system configuration) and save a copy of the configuration.

Table 4 shows the compatibility between VibroSight software and VM600^{Mk2} AMC10^{Mk2} module hardware (that is, AMC10^{Mk2} firmware).

Table 5 shows the compatibility between VibroSight software and VM600^{Mk2} CPUM^{Mk2} module hardware (that is, CPUM^{Mk2} firmware).

Table 6 shows the compatibility between VibroSight software and VM600 CPUR2 card hardware (that is, CPUR2 firmware).

Table 7 shows the compatibility between VibroSight software and VM600 CPUR card hardware (that is, CPUR firmware).

Table 8 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 VM600Mk2 MPC4Mk2 firmware compatibility
for later standard versions of the MPC4Mk2 (PNRs 600-041 / 600-041-001-002 and 600-041-000-002)

VibroSight software version Part number (PNR)	VM600Mk2 MPC4Mk2 firmware								
	Machinery protection firmware (`640-025-vvv-ppp.Mpc4g2Fw`)								
	640-025-004-003	640-025-005-000	640-025-006-000	640-025-007-001	640-025-008-000	640-025-009-001	640-025-010-000	640-025-011-000	640-025-012-000
	Condition monitoring firmware (`640-033-vvv-ppp.VxeFw`)								
	---	640-033-001-000	640-033-002-000	640-033-003-000	640-033-004-000	640-033-005-000	640-033-006-000	640-033-007-000	640-033-008-000
	Recovery firmware (`640-031-vvv-ppp.Mpc4g2Fw`)								
	640-031-003-006			640-031-005-001	640-031-006-000		640-031-007-000	640-031-007-001	640-031-008-001
	Protection test firmware (`640-032-vvv-ppp.VxeFw`)								
	640-032-001-001		640-032-003-000		640-032-004-000		640-032-004-001		640-032-005-000
7.0.0 609-010-000-001	✔ See note 1a	✔ See note 1b							
7.1.0 609-010-000-001			✔ See note 2						
7.2.0 609-010-000-001				✔ See note 3					
7.3.0 609-010-000-001					✔ See note 4				
7.4.0 609-010-000-001						✔ See note 5			
7.5.0 609-010-000-001						✔			
7.6.0 609-010-000-001							✔ See note 6		
7.7.0 609-010-000-001								✔ See note 7	
7.8.0 609-010-000-001									✔ See note 8

Notes for Table 1 (see the next page)

Notes for Table 1

1a. For 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.

1b. For 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.

2. For information on these versions of VM600^{Mk2} MPC4^{Mk2} firmware, refer to the VibroSight 7.1 release notes.
A firmware upgrade is required in order to run VibroSight 7.1.0 or later.

3. For information on these versions of VM600^{Mk2} MPC4^{Mk2} firmware, refer to the VibroSight 7.2 release notes.
A firmware upgrade is required in order to run VibroSight 7.2.0 or later.

4. For information on these versions of VM600^{Mk2} MPC4^{Mk2} firmware, refer to the VibroSight 7.3 release notes.
A firmware upgrade is required in order to run VibroSight 7.3.0 or later.

5. For information on these versions of VM600^{Mk2} MPC4^{Mk2} firmware, refer to the VibroSight 7.4 release notes.
A firmware upgrade is required in order to run VibroSight 7.4.0 or later.

6. For information on these versions of VM600^{Mk2} MPC4^{Mk2} firmware, refer to the VibroSight 7.6 release notes.
A firmware upgrade is required in order to run VibroSight 7.6.0 or later.

7. For information on these versions of VM600^{Mk2} MPC4^{Mk2} firmware, refer to the VibroSight 7.7 release notes.
A firmware upgrade is required in order to run VibroSight 7.7.0 or later.

8. For information on these versions of VM600^{Mk2} MPC4^{Mk2} firmware, see 2.13 MPC4Mk2 + IOC4Mk2 module firmware.
A firmware upgrade is required in order to run VibroSight 7.8.0 or later.

Table 2: VibroSight software and VM600^Mk2 MPC4^Mk2 firmware compatibility
for the original standard version of MPC4^Mk2 (PNRs 600-041 / 600-041-000-001) – no longer supported

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`		
	Protection 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 2 (see the next page)

Notes for Table 2

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 Parker Meggitt (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. For 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. For 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. For information on these versions of VM600^{Mk2} MPC4^{Mk2} firmware, refer to the VibroSight 7.1 release notes.
A firmware upgrade is required in order to run VibroSight 7.1.0.

Table 3: VibroSight software and VM600^{Mk2} MPC4^{Mk2} SIL firmware compatibility
for the SIL version of the MPC4^{Mk2} (PNRs 600-040 / 600-040-vvv-vvv)

VibroSight software version Part number (PNR)	VM600^{Mk2} MPC4^{Mk2} SIL firmware					
	SIL machinery protection firmware (`640-024-vvv-ppp.SafeMpc4g2Fw`)					
	`640-024-001T005`	`640-024-001T006`	`640-024-001-000`	`640-024-002T002`	`640-024-002T004`	`640-024-002T005`
	Condition monitoring firmware (`640-033-vvv-ppp.VxeFw`)					
	`640-033-004-000`	`640-033-005-000`		`640-033-006-000`	`640-033-007-000`	`640-033-007-001`
	SIL recovery firmware (`640-026-vvv-ppp.SafeMpc4g2Fw`)					
	`640-026-001-000`			`640-026-002-000`	`640-026-002-001`	`640-026-003-000`
	Protection test firmware (`640-032-vvv-ppp.VxeFw`)					
	`640-032-004-000`			`640-032-004-001`		`640-032-005-000`
7.3.0 609-010-000-001	✔ See note 1					
7.4.0 609-010-000-001		✔ See note 2				
7.5.0 609-010-000-001			✔ See note 3			
7.6.0 609-010-000-001				✔ See note 4		
7.7.0 609-010-000-001					✔ See note 5	
7.8.0 609-010-000-001						✔ See note 6

Notes for Table 3 (see the next page)

Notes for Table 3

1. For information on these versions of VM600^{Mk2} MPC4^{Mk2} SIL firmware, refer to the VibroSight 7.3 release notes.
A firmware upgrade is required in order to run VibroSight 7.3.0 or later.

2. For information on these versions of VM600^{Mk2} MPC4^{Mk2} SIL firmware, refer to the VibroSight 7.4 release notes.
A firmware upgrade is required in order to run VibroSight 7.4.0 or later.

3. For information on these versions of VM600^{Mk2} MPC4^{Mk2} SIL firmware, refer to the VibroSight 7.5 release notes.
A firmware upgrade is required in order to run VibroSight 7.5.0 or later.

4. For information on these versions of VM600^{Mk2} MPC4^{Mk2} SIL firmware, refer to the VibroSight 7.6 release notes.
A firmware upgrade is required in order to run VibroSight 7.6.0 or later.

5. For information on these versions of VM600^{Mk2} MPC4^{Mk2} SIL firmware, refer to the VibroSight 7.7 release notes.
A firmware upgrade is required in order to run VibroSight 7.7.0 or later.

6. For information on these versions of VM600^{Mk2} MPC4^{Mk2} SIL firmware, see 2.14 MPC4Mk2 + IOC4Mk2 SIL module firmware (SIL).
A firmware upgrade is required in order to run VibroSight 7.8.0 or later.

Table 4: VibroSight software and VM600^{Mk2} AMC10^{Mk2} firmware compatibility

	VM600^{Mk2} AMC10^{Mk2} firmware
VibroSight software version Part number (PNR)	Machinery protection firmware (`640-040-vvv-ppp.Amc10Fw`)
	`640-040-` `001-000`
	Condition monitoring firmware (`640-042-vvv-ppp.VxeFw`)
	`640-042-` `001-000`
	Recovery firmware (`640-038-vvv-ppp.Amc10Fw`)
	`640-038-` `001-000`
	Protection test firmware (`640-041-vvv-ppp.VxeFw`)
	`640-041-` `001-000`
7.8.0 609-010-000-001	✓ See note 1

Notes for Table 4

1. For information on these versions of VM600^{Mk2} AMC10^{Mk2} firmware, see 2.18 VSI010 + VSB010 module firmware.
A firmware upgrade is required in order to run VibroSight 7.8.0 or later.

Table 5: VibroSight software and VM600^{Mk2} CPUM^{Mk2} firmware compatibility

VibroSight software version Part number (PNR)	VM600^{Mk2} CPUM^{Mk2} firmware Base-system / Applications firmware (`*.tgz`)						
	640-034-001-001	640-034-002-000	640-034-003-000	640-034-003-001	640-034-004-000	640-034-005-001	640-034-006-000
7.0.0 609-010-000-001	✔ See note 1						
7.1.0 609-010-000-001		✔ See note 2					
7.2.0 609-010-000-001			✔ See note 3				
7.3.0 609-010-000-001				✔ See note 4			
7.4.0 609-010-000-001				✔			
7.5.0 609-010-000-001					✔ See note 5		
7.6.0 609-010-000-001					✔		
7.7.0 609-010-000-001						✔ See note 6	
7.8.0 609-010-000-001							✔ See note 7

Notes for Table 5 (see the next page)

Notes for Table 5

1. 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.

2. For information on this version of VM600^{Mk2} CPUM^{Mk2} firmware, refer to the VibroSight 7.1 release notes.
A firmware upgrade is required in order to run VibroSight 7.1.0 or later.

3. For information on this version of VM600^{Mk2} CPUM^{Mk2} firmware, refer to the VibroSight 7.2 release notes.
A firmware upgrade is required in order to run VibroSight 7.2.0 or later.

4. For information on this version of VM600^{Mk2} CPUM^{Mk2} firmware, refer to the VibroSight 7.3 release notes.
A firmware upgrade is not required but is strongly recommended in order to run VibroSight 7.3.0 or later.

5. For information on this version of VM600^{Mk2} CPUM^{Mk2} firmware, refer to the VibroSight 7.5 release notes.
It is important to note that this firmware version is incompatible with previous VM600^{Mk2} CPUM^{Mk2} firmware versions or the VM600 CPUR2 card and may cause hardware damage if installed. Therefore, to ensure compatibility and prevent any issues, a VM600^{Mk2}/VM600 rack should only contain CPUM^{Mk2} modules with firmware version 640-034-004-000 or later. Also, during the firmware upgrade process, it's crucial to remove all other VM600^{Mk2} CPUM^{Mk2} modules or VM600 CPUR2 cards from the rack in order to avoid potential damage. That is, ensure that only the VM600^{Mk2} CPUM^{Mk2} module receiving the firmware upgrade is present in the rack during the upgrade process.
A firmware upgrade is required in order to run VibroSight 7.5.0 or later.

6. For information on this version of VM600^{Mk2} CPUM^{Mk2} firmware, refer to the VibroSight 7.7 release notes.
A firmware upgrade is required in order to run VibroSight 7.7.0 or later.

7. For information on this version of VM600^{Mk2} CPUM^{Mk2} firmware, see 2.17 CPUMMk2 + IOCNMk2 module firmware.
A firmware upgrade is required in order to run VibroSight 7.8.0 or later.

Table 6: VibroSight software and VM600 CPUR2 firmware compatibility

VibroSight software version Part number (PNR)	VM600 CPUR2 firmware See note 1		
	Base-system firmware (`*.tgz`)		
	640-014-001-005	640-014-001-006	640-014-001-007
	Applications firmware (`*.tgz`)		
	640-015-001-005	640-015-001-006	640-015-001-007
7.0.0 609-010-000-001	✔ See note 2		
7.1.0 609-010-000-001		✔ See note 3	✔
7.2.0 609-010-000-001		✔	✔
7.3.0 609-010-000-001		✔	✔
7.4.0 609-010-000-001		✔	✔
7.5.0 609-010-000-001		✔	✔
7.6.0 609-010-000-001			✔ See note 4
7.7.0 609-010-000-001			✔
7.8.0 609-010-000-001			✔

Notes for Table 6 (see the next page)

Notes for Table 6

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. 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 7.1.0 or later.

3. 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 7.1.0 or later.

4. For information on this version of VM600[Mk2] CPUR2 firmware, refer to the VibroSight 7.6 release notes.

Table 7: 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
7.0.0 609-010-000-001	✓ See note 2	✓ See note 3
7.1.0 609-010-000-001	✓	✓
7.2.0 609-010-000-001	✓	✓
7.3.0 609-010-000-001	✓	✓
7.4.0 609-010-000-001	✓	✓
7.5.0 609-010-000-001	✓	✓
7.6.0 609-010-000-001	✓	✓
7.7.0 609-010-000-001	✓	✓
7.8.0 609-010-000-001	✓	✓

Notes for Table 7 (see the next page)

Notes for Table 7

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 8: 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	640-003-001-017	640-003-001-018
	Applications firmware (`*.tgz`)		
	640-010-001-016	640-010-001-017	640-010-001-018
7.0.0 609-010-000-001	✔ See note 2		
7.1.0 609-010-000-001	✔		
7.2.0 609-010-000-001	✔		
7.3.0 609-010-000-001	✔		
7.4.0 609-010-000-001	✔		
7.5.0 609-010-000-001		✔ See note 3	✔ See note 4
7.6.0 609-010-000-001		✔	✔
7.7.0 609-010-000-001			✔
7.8.0 609-010-000-001			✔

Notes for Table 8 (see the next page)

Notes for Table 8

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.

3. For information on this version of VM600 XMx16 firmware, refer to the VibroSight 7.5 release notes.
A firmware upgrade is required in order to run VibroSight 7.5.0 or later.

4. For information on this version of VM600 XMx16 firmware, refer to the VibroSight 7.7 release notes
A firmware upgrade is required in order to run VibroSight 7.7.0 or later.

7.2.2 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 Parker Meggitt (Meggitt SA) should also be stored in these directories.

Table 9 shows the compatibility between VibroSight software and the VibroSmart VSI010 firmware.

Table 10 shows the compatibility between VibroSight software and the VibroSmart VSN010 firmware.

Table 11 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 9: VibroSight software and VibroSmart VSI010 firmware compatibility

VibroSight software version Part number (PNR)	VSI010 firmware (*.xmsifw) See note 1				
	642-002-000-013	642-002-000-014	642-002-000-015	642-002-000-016	642-002-000-017
7.0.0 609-010-000-001	✔ See notes 2 and 3				
7.1.0 609-010-000-001		✔ See notes 2 and 4			
7.2.0 609-010-000-001		✔			
7.3.0 609-010-000-001		✔			
7.4.0 609-010-000-001		✔			
7.5.0 609-010-000-001		✔			
7.6.0 609-010-000-001			✔ See notes 2 and 5	✔ See notes 2 and 6	
7.7.0 609-010-000-001				✔	
7.8.0 609-010-000-001					✔ See notes 2 and 7

Notes for Table 9 (see the next page)

Notes for Table 9

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. 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.

4. For information on this version of VibroSmart VSI010 firmware, refer to the VibroSight 7.1 release notes.
A firmware upgrade is required in order to run VibroSight 7.1.0 or later.

5. For information on this version of VibroSmart VSI010 firmware, refer to the VibroSight 7.6 release notes.
A firmware upgrade is required in order to run VibroSight 7.6.0 or later.

6. For information on this version of VibroSmart VSI010 firmware, refer to the VibroSight 7.7 release notes.
A firmware upgrade is required in order to run VibroSight 7.7.0 or later.

7. For information on this version of VibroSmart VSI010 firmware, see 2.18 VSI010 + VSB010 module firmware.
A firmware upgrade is required in order to run VibroSight 7.8.0 or later.

Table 10: 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	642-004-000-013
7.0.0 609-010-000-001	✓ See note 2		
7.1.0 609-010-000-001		✓ See notes 2 and 3	
7.2.0 609-010-000-001		✓	
7.3.0 609-010-000-001		✓	
7.4.0 609-010-000-001		✓	
7.5.0 609-010-000-001		✓	
7.6.0 609-010-000-001			✓ See notes 2 and 4
7.7.0 609-010-000-001			✓
7.8.0 609-010-000-001			✓

Notes for Table 10 (see the next page)

Notes for Table 10

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, refer to the VibroSight 7.1 release notes.
A firmware upgrade is required in order to run VibroSight 7.1.0 or later.

4. For information on this version of VibroSmart VSN010 firmware, refer to the VibroSight 7.6 release notes.
A firmware upgrade is required in order to run VibroSight 7.6.0 or later.

Table 11: VibroSight software and VibroSmart VSV30x firmware compatibility

VibroSight software version Part number (PNR)	VSV30x firmware (*.xtranfw) See note 1			
	642-001-000-019	642-001-000-020	642-001-000-021	642-001-000-022
7.0.0 609-010-000-001	✔ See notes 2 and 3			
7.1.0 609-010-000-001		✔ See notes 2 and 4		
7.2.0 609-010-000-001		✔		
7.3.0 609-010-000-001		✔		
7.4.0 609-010-000-001		✔		
7.5.0 609-010-000-001			✔ See notes 2 and 5	
7.6.0 609-010-000-001				✔ See notes 2 and 6
7.7.0 609-010-000-001				✔
7.8.0 609-010-000-001				✔

Notes for Table 11 (see the next page)

Notes for Table 11

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. 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.

4. For information on this version of VibroSmart VSV30x firmware, refer to the VibroSight 7.1 release notes.
A firmware upgrade is required in order to run VibroSight 7.1.0 or later.

5. For information on this version of VibroSmart VSV30x firmware, refer to the VibroSight 7.5 release notes.
A firmware upgrade is required in order to run VibroSight 7.5.0 or later.

6. For information on this version of VibroSmart VSV30x firmware, refer to the VibroSight 7.6 release notes.
A firmware upgrade is required in order to run VibroSight 7.6.0 or later.

7.2.3 Updating the firmware using VibroSight System Manager

When performing VibroSight software upgrades, it is strongly recommended to systematically upgrade the firmware of VM600^{Mk2}/VM600 and/or VibroSmart modules/devices to the latest compatible version.

Failure to perform a necessary VibroSight-compatible VM600^{Mk2}/VM600 and/or VibroSmart modules/devices 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 VM600^{Mk2}/VM600 and/or VibroSmart modules/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:	Updating the firmware for VM600^{Mk2}/VM600 and/or VibroSmart modules/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. It is therefore strongly recommended to change the firmware of VibroSight-compatible hardware only when it is necessary. For example, when the devices must be updated to be compatible with a VibroSight software upgrade.

During the firmware update of a device, the module or card 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. |

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. |

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 (VM600^Mk2/VM600 and/or VibroSmart modules/devices) 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 VM600^Mk2/VM600 and/or VibroSmart modules/devices in the tree structure or some are missing, verify your network connections.

3. Select the module 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 💾 **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 VM600^Mk2/VM600 or VibroSmart modules/devices selected.

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 💾 **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 *VibroSight* help.

The **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.

7.3 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.

8 Customer support

8.1 Contacting us

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

Customer support
Parker Meggitt (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

8.2 Technical support

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

- General advice

- Technical advice

- Troubleshooting

- Site visits.

8.3 Sales and repairs support

Parker Meggitt 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 and extended support ended 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 and extended support ended in 2023

VibroSight software and Microsoft® .NET requirements

VibroSight software version	Microsoft .NET requirements
VibroSight 7.8.x or later	.NET 8.0 Desktop Runtime (v8.0.20) or later and ASP.NET Core 8.0 Runtime (v8.0.20) or later **See note 1**
VibroSight 7.6.x or later	.NET 8.0 Desktop Runtime (v8.0.8) or later
VibroSight 7.4.x or later	.NET 7.0 SDK v7.0.306 or later
VibroSight 3.7.0 or later	.NET Framework 4.7.2 See note 2
VibroSight 3.4.0 or later	.NET Framework 4.7.1 See note 3
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 4
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. The ASP.NET Core Runtime is dependent on the .NET Runtime.

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

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

4. 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).