

MULTICHANNEL VMS CONTROLLER VM 4040 OVERVIEW

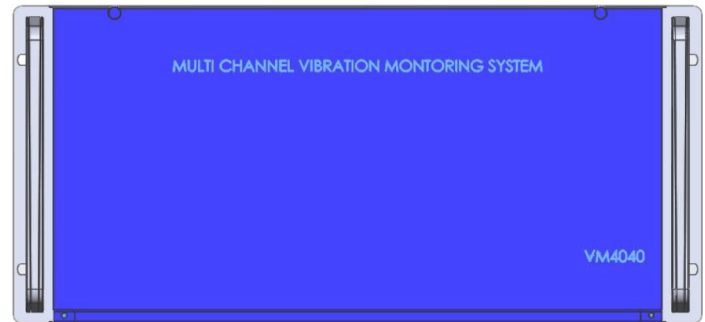
Highlights:

- ✓ Vibration Measurement
- ✓ On Screen FFT Data
- ✓ RMS velocity raw
- ✓ RMS acceleration raw
- ✓ RMS velocity envelope
- ✓ RMS acceleration envelope
- ✓ Kurtosis raw
- ✓ VDI 3832 K(t) raw
- ✓ API 670 Compliant
- ✓ ISO 10816
- ✓ Noise velocity raw
- ✓ Noise acceleration raw
- ✓ Noise velocity envelope
- ✓ Noise acceleration envelope
- ✓ Crest factor raw
- ✓ Skewness raw

Note: This document is just an overview for controller VM 4040 and not a manual.

Features

- 19" system rack with a standard height of 5U
- Robust aluminium construction
- Easy mounting or removal of VMS and other modules, without effecting the working of other cards & controller
- Cabinet or panel mounting
- Status indication on each module



VM 4040 Rack Controller

- RAW output selectable from HMI screen through software CMC 4040 to available BNC connector, means you select module on HMI screen and that module output will be available on BNC connectors, this way we do not require so many BNC connectors for operation.

Description

The VM4040 controller is designed for easy operation and give maximum comfort to the operators, however it comes with required password protection to avoid unauthorised access to the system.

With sturdy alluminium enclosure VM 4040 comes in 19" rack size with 5U height. It has many componets for its operation like 4 channel controller cards, redundant power supply, seperate analogue output modules, digital output modules and communication modules for required interfacing with DCS / PLC system of end user.

From front it looks like a simple instrument with a plane front plate but with two screws on the top can be used to open the front hinged plate at the bottom and gives access to the system cards, which are mounted on another base plate behind main front cover of instrument.

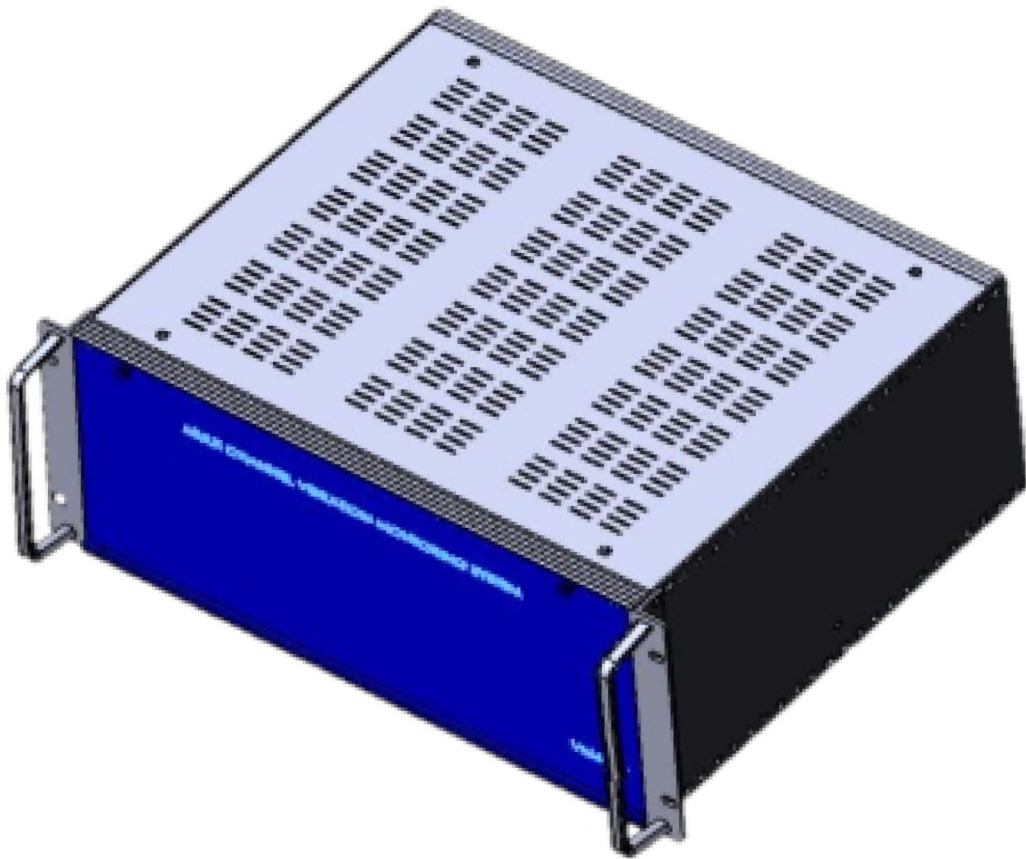
A cover on the front gives full protection to the system cards from the atmospheric dust environment. No component on the front gives system a clean look and makes the complete system very impressive.

4 channel VMS modules VM 100 can be installed as required and easily inserted type hot swapping modules, details of the same can be seen on the given data sheets on later pages of this document. Along with VM 100 modules power supply module PS 9400 is installed to give required power with redundant feature, so in case of failure of one power supply system working will not be effected. CPU of the system too have redundant facility to avoid any disturbance to system working and this way we get amooth performance from the system. In case of any of the module having problem, can be

identified from the indication LED's on each module. The status LED indication details are given in the relevant data sheets of each module. Additional modules are also selectable as per requirement for analogue 4-20 mA output, digital outputs, communication etc. All the modules are inserted type hot swappable and do not effect the working of the system.

Power supply of the system is also configurable and needs to be confirmed during ordering of the system. 220 VAC / 110 VAC / 24 VDC are the standard system supply options to be choosen.

Phase sensor output & raw output also available on system base plate behind front plate through BNC connectors. Just open the front plate and use as required. Due to closed front plate you do not get any rust issues on BNC connectors and are always available as new one for use.



Specifications

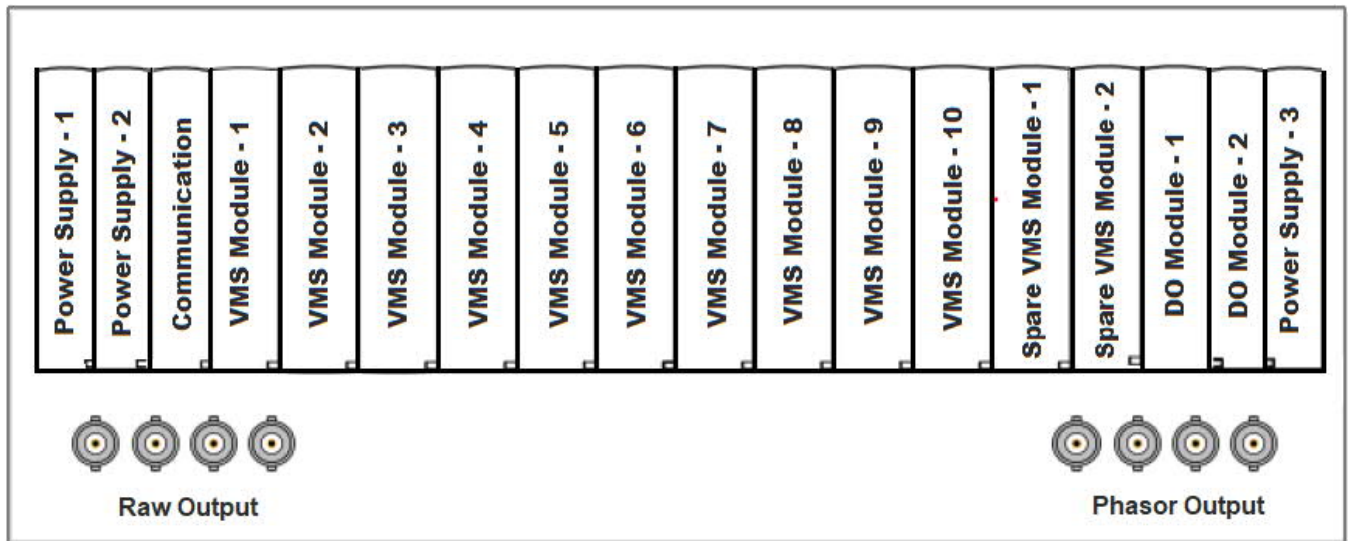
API 670 Compliant

General			
Channel Capacity	:	Standard 40 numbers	Optional Up to 64 Channel
Rack Size	:	19" Height 5U	
Power Supply	:	220 / 110 V AC	24 V DC
Communication	:	Ethernet TCP IP / Modbus 485	Profibus
Analogue Outputs (4-20mA)	:	Ethernet TCP IP / Modbus 485	Profibus
Digital Outputs	:	2 per module (1 Alarm & 1Trip per 4 channel)	Up to 8 per module (1 Alarm & 1Trip per channel)
Phase Reference Output	:	4 Numbers per rack	8 Numbers per rack

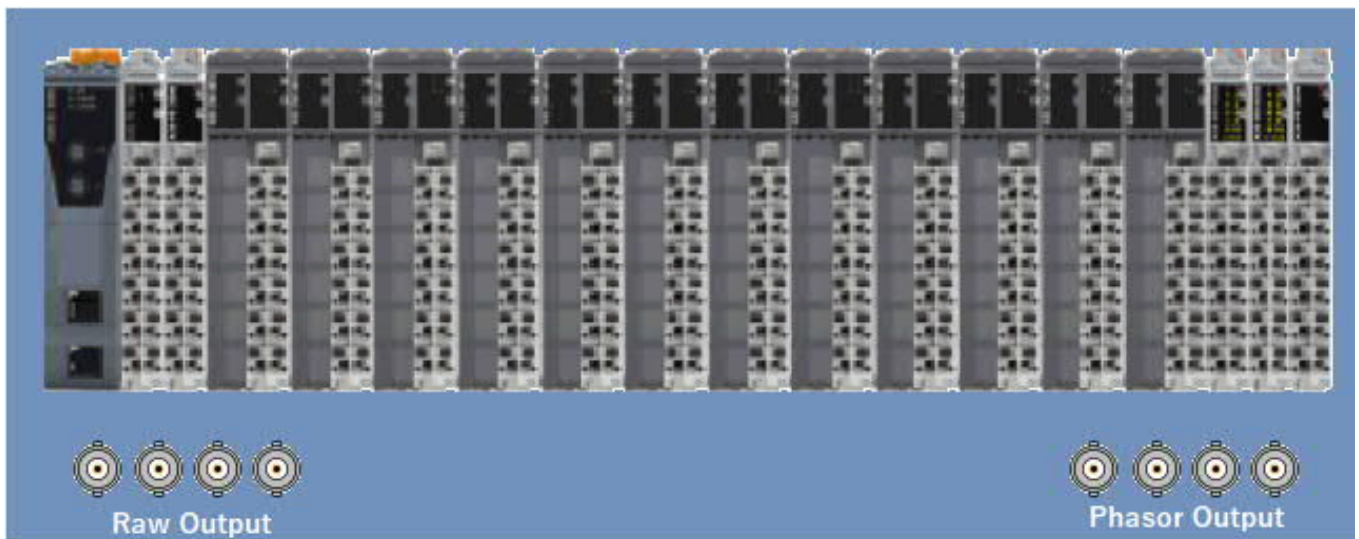
Environmental

Operating Temperature	:	-25 to +65 °C (In Panel)	-10 to 50 °C (Without panel)
Storage Temperature	:	-40 to +90 °C	
Humidity	:	Max. 95 % non-condensing	

Mounting Layout



Mounting Plate View



Mounting plate is the plate behind front plate of the instrument, above picture shows the view with different modules mounted including VMS modules is shown in above picture, below is the details of modules mounted:

1. Power supply PS 9400: This module is used for providing power supply to all the units
2. power supply PS 3300: This module is provided for redundancy of power supply and in case of failure of PS 9400 this supply takes over automatically, also if this module fails PS 9400 takes over and provides required supply. Though the specs of both supplies are same, different model code is due to different mechanical dimensions of both modules. PS 9400 is fitted at the beginning of plate where as PS 3300 is fitted inbetween of the modules.

3. Communication Module CS 1030: This module provides Modbus 485 communication to other devices.
4. Vibration Modules VM100: VM 100 modules are used to process the signals received from vibration sensors with sensitivity of 100 mv/g. This module is used to process the signal and display the vibration values. With handling capacity of 4 sensors VM100 provides direct FFT data for analysis of the signal.
5. DO 9322: 12 channel DO modules are used for required digital outputs for alarm and trip.

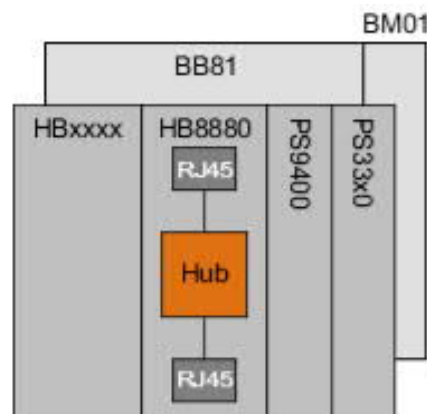
Module Mounting Scheme



VM 4040 processing modules have three main parts for easy mounting and operation. Base is used to connect to previous module base and main module is connected with on the base. These are inserted type hot swappable modules and can be remove or inserted any time, even the instrument is running. when the centre main module is connected, outer connector module can be inserted to the main part, this outer part is used for wiring of the module. All the parts of the modules are easy plug and play type.

Redundancy:

VM 4040 provides redundancy for power supply, which includes PS 9400 & PS 3300. For uninterrupted power to the system, redundant power supply is considered, in case of failure of one power supply other immediately takes over and system continues working without effected, power supply and error message for the same is displayed in HMI. PS 9400 and PS 3300 works as redundant power supplies, both are same in power specs but due to different mechanical arrangements they are identified as different modules.



Vibration Module VM 100

1.1 Vibration measurement module

VM100 condition monitoring module has four input channels. For each channel, an acceleration sensor can be connected and evaluated via the IEPE (Integrated Electronic Piezo Electric) interface.

The signals are sampled at 51.2 kHz and converted into more than 70 condition parameters directly in the module during runtime.

Of the parameters, 32 are frequency bands that can be configured to represent normed damage frequencies or specific machine vibration signatures. The remaining parameters are fixed broadband values, such as the kurtosis and the crest factor, or are used to monitor the ISO 10816 standard limits for the vibration velocity.

At a compact 25 x 99 mm, the VM 100 is one of the smallest 4-channel IEPE condition monitoring modules in the world.

The module provides significant parameters such as: ■

- Imbalance, resonance, misalignment
- Bearing damage, gear damage
- Tool wear (drilling, milling, sawing)

General module functions: ■

- Measurement
- Signal preparation
- Parameter calculation



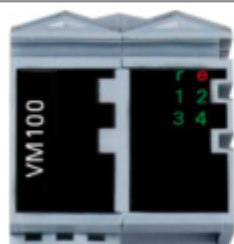
Technical data and parameters - VM 100 module Compact

- 4x IEPE (Integrated Electronic Piezo Electric)
- 24-bit resolution
- Internal sampling rate: 51.2 kHz (Measurable input frequency: 10 kHz)

Intelligent

- Integrated data analysis based on raw values (e.g. imbalance, misalignment) and envelope curve evaluation (e.g. bearings, gears)
- Configuring the module and interpreting the results

LED status indicators

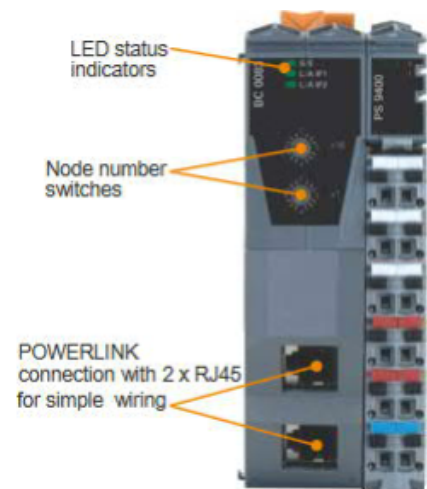
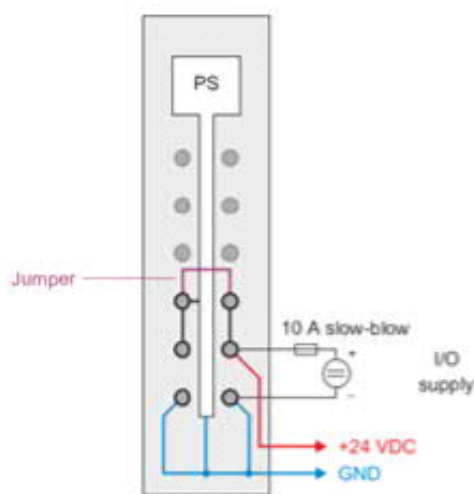
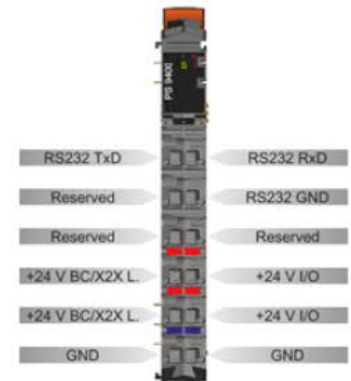
Figure	LED	Color	Status	Description
	r	Green	Off	No power to module
			Single flash	RESET mode
			Double flash	BOOT mode (during firmware update) ¹⁾
			Blinking	PREOPERATIONAL mode
			On	RUN mode
	e	Red	Off	No power to module or everything OK
			On	Warning, error or reset status
	e + r	Red on and green single flash		Invalid firmware
	1 - 4	Green	On	Status of the respective acceleration sensor (no open circuit)

Power Supply PS 9400

PS 9400

The supply module is used together with a bus controller. It is equipped with a feed for the bus controller, the X2X link and internal power supply.

- Supply for the bus controller, X2X link and internal I/O supply.
- Feed and bus controller / X2X link supply electrically isolated.
- Redundancy of bus controller / X2X link supply possible by operating multiple supply modules simultaneously.
- Service interface RS 232



The bus controller makes it possible to connect X2X Link I/O nodes to POWERLINK. It is also possible to operate the X2X Link cycle synchronously 1:1 or synchronous to POWERLINK using a prescaler.

POWERLINK is a standard protocol for Fast Ethernet with hard real-time properties. The Ethernet POWERLINK Standardization Group (EPSG) ensures that the standard remains open and is continually developed: www.ethernet-powerlink.org

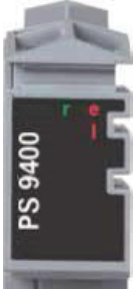
-POWERLINK

-I/O configuration and Firmware update via the fieldbus

-Integrated hub for efficient cabling

bus controller, 1 POWERLINK interface, integrated 2-port hub, 2x RJ45, order bus base, power supply module and terminal block separately.

LED status indicators

Figure	LED	Color	Status	Description
	r	Green	Off	No power to module
			Single flash	RESET mode
			Blinking	PRE OPERATIONAL mode
			On	RUN mode
	e	Red	Off	No power to module or everything OK
			Double flash	LED indicates one of the following states: <ul style="list-style-type: none"> The bus controller / X2X Link supply for the power supply is overloaded I/O supply too low Input voltage for bus controller / X2X Link supply too low
	e + r	Red on / Green single flash		Invalid firmware
l		Red	Off	The bus controller / X2X Link supply is within the valid limits
			On	The bus controller / X2X Link supply for the power supply is overloaded


PS3300

The supply module is equipped with a feed for the X2X Link as well as the internal I/O supply.

- Feed for X2X Link and internal I/O supply
- Electrical isolation of feed and X2X Link supply
- Redundancy of X2X Link supply possible by operating multiple supply modules simultaneously
- power supply module, for X2X Link and internal I/O supply



LED status indicators

Figure	LED	Color	Status	Description
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	e + r	Red on / Green single flash		Invalid firmware
l		Red	Off	The X2X Link supply is within the valid limits
			On	The X2X Link supply for the power supply is overloaded

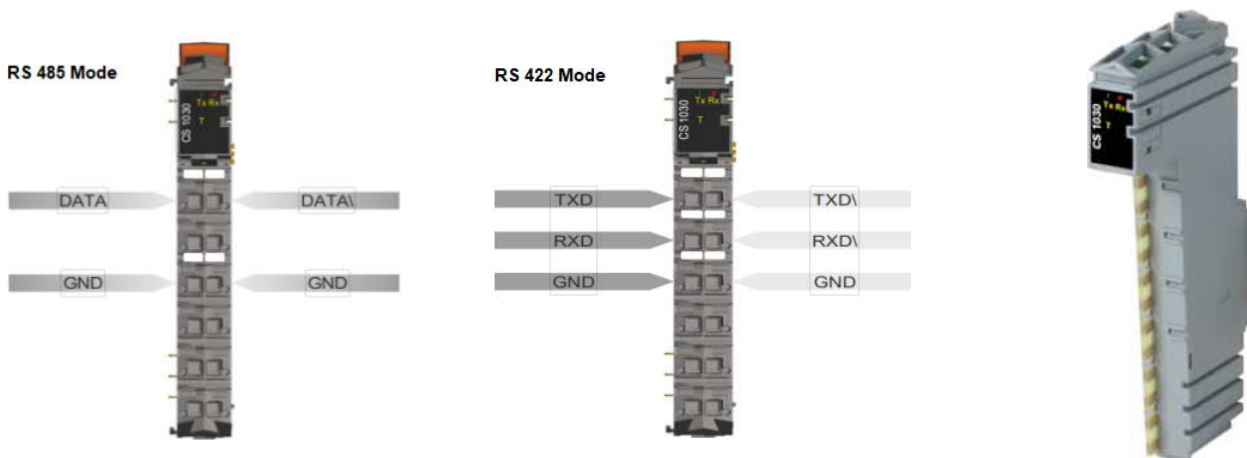
Communication Module CS 1030

In addition to the standard I/O, complex devices often need to be connected. The CS communication modules are designed precisely for cases like this. As normal X20 electronics modules, they can be placed anywhere on the remote backplane.


-RS485/RS422 interface for serial, remote connection of complex devices to the X20 system

-Integrated terminating resistor

-Interface module, 1 RS422/485 interface, max. 115.2 kbit/s



LED status indicators

Figure	LED	Color	Status	Description
	r	Green	Off	No power to module
			Single flash	RESET mode
			Double flash	BOOT mode (during firmware update) ¹⁾
			Blinking	PREOPERATIONAL mode
			On	RUN mode
	e	Red	Off	No power to module or everything OK
			Single flash	An I/O error has occurred,
			On	Error or reset status
	e + r	Red on / Green single flash		Invalid firmware
	Tx	Yellow	On	The module transmits data via the RS485/RS422 interface
	Rx	Yellow	On	The module receives data via the RS485/RS422 interface
	T	Yellow	On	Terminating resistor integrated in the module switched on

Ordering Code

VM4040-10 - Controller with measurement, raw data, phase reference, software and analysis features

VM 4040-20 - Controller without raw data and analysis features.