vibro–meter®

VM600^Mk2
CPUM^Mk2 + IOCN^Mk2
rack controller and communications interface module

CPUM^Mk2   IOCN^Mk2

CE CSA us

KEY FEATURES AND BENEFITS

- VibroSight® compatible hardware from the vibro-meter® product line

- VM600^Mk2 (second generation) rack controller and communications interface module

- VM600^Mk2 module data aggregation, processing and sharing

- Industry standard fieldbus communications interfaces: Modbus TCP and PROFIBUS DP

- Mathematical processing of data to be shared via fieldbus

- System/module status (health) information available via fieldbus

- Front-panel alarm reset (AR) button

- VM600^Mk2 rack (CPUM^Mk2) security with a removable key

- Two system Ethernet connections and two fieldbus connections can run simultaneously

- Module-level communications redundancy with two fieldbuses per module: Ethernet and/or serial

- Rack-level communications redundancy with two modules per rack (module redundancy)

KEY BENEFITS AND FEATURES *(cont'd)*

- Two output relays to signal system statuses and alarms

- CPUM^Mk2 + IOCN^Mk2 module diagnostic logs available via the VibroSight® software

- Live insertion and removal of modules (hot-swappable)

- Gigabit (1 Gbps) system Ethernet communication

- Front-panel status indicators (LEDs)

- Compatible with later VM600 system racks (ABE04x) with I^2C interface (VME utility bus)

APPLICATIONS

- Rack controller and communications interface for VM600^{Mk2} systems

- Communications gateway between VM600^{Mk2} and third-party systems, such as DCS or PLC

- Enables sharing of data from VM600^{Mk2} monitoring modules in machinery protection, condition monitoring and/or combustion monitoring applications

APPLICATIONS *(continued)*

- Module redundancy with two CPUM^{Mk2} + IOCN^{Mk2} modules per rack helps ensure VM600^{Mk2} system communications for applications where the cost of failure is high

- Alternatively, module redundancy (two CPUM^{Mk2} + IOCN^{Mk2} modules per rack) can be used to implement more complex communication configurations

DESCRIPTION

Introduction

The VM600^{Mk2} CPUM^{Mk2} + IOCN^{Mk2} rack controller and communications interface module is designed for operation with the second generation of VM600^{Mk2} rack-based machinery protection system, from Parker Meggitt's vibro-meter$^®$ product line. The CPUM^{Mk2} + IOCN^{Mk2} module consists of central processing unit (CPU) and input/output (interface) modules that together act as a system controller and data communications gateway for VM600^{Mk2} systems.

In critical applications where the cost of failure is high, module redundancy with two CPUM^{Mk2} + IOCN^{Mk2} modules per VM600^{Mk2} system rack (ABE04x) can be used to obtain true rack-level communications redundancy. This is a cost-effective solution where increased communications reliability and availability are required, for example, to help ensure uninterrupted operation in critical environments.

Alternatively, module redundancy can be used to implement complex communication configurations that require more than the two fieldbuses available per CPUM^{Mk2} + IOCN^{Mk2} module.

VM600^{Mk2} rack-based monitoring systems

The vibro-meter$^®$ VM600^{Mk2} rack-based monitoring system is the evolution of Parker Meggitt's solution for the protection and monitoring of rotating machinery used in the power generation and oil & gas industries. VM600^{Mk2} solutions are recommended when a centralised monitoring system with a medium to large number of measurement points (channels) is required. It is typically used for the monitoring and/or protection of larger machinery such as gas, steam and hydro turbines, and generators, smaller

machines such as compressors, fans, motors, pumps and propellers, as well as balance-of-plant (BOP) equipment.

A VM600^{Mk2} system consists of a 19" rack, a rack power supply and one or more monitoring modules. Optionally, relay modules and rack controller and communications interface modules can also be included.

Two types of rack are available: a VM600^{Mk2} system rack (ABE04x, 6U) that can house up to twelve monitoring modules, and a VM600^{Mk2} slimline rack (ABE056, 1U) that can house one monitoring module. The racks are typically mounted in standard 19" rack cabinets or enclosures installed in an equipment room.

Different VM600^{Mk2} monitoring modules are available for machinery protection, condition monitoring and/or combustion monitoring applications. For example, the MPC4^{Mk2} + IOC4^{Mk2} module supports both machinery protection and condition monitoring, the XMV16 + XIO16T module supports extended condition monitoring for vibration and the XMC16 + XIO16T module supports extended condition monitoring for combustion.

Note: For the MPC4^{Mk2} + IOC4^{Mk2} machinery protection and condition monitoring module, the machinery protection functionality is available by default, while the condition monitoring functionality is optional and depends on the purchased VibroSight$^®$ software license.

The RLC16^{Mk2} relay module is an optional module used to provide additional relays when the four user-configurable relays per MPC4^{Mk2} + IOC4^{Mk2} module are not sufficient for an application.

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DESCRIPTION *(continued)*

The CPUM^{Mk2} + IOCN^{Mk2} rack controller and communications interface module is an optional module used to provide additional VM600^{Mk2} system functionality such as fieldbus communications (Modbus TCP and/or PROFIBUS DP); module data aggregation, processing and sharing; fieldbus (module-level) and/or module (rack-level) communications redundancy; front-panel alarm reset (AR); MPS rack (CPUx) security; system event and measurement event logging.

VM600^{Mk2} rack-based monitoring systems complement the VibroSmart$^®$ distributed monitoring systems that are also available from Parker Meggitt's vibro-meter$^®$ product line, and are compatible with the same VibroSight$^®$ machinery monitoring software suite.

CPUM^{Mk2} + IOCN^{Mk2} modules and VM600^{Mk2} racks

The CPUM^{Mk2} + IOCN^{Mk2} rack controller and communications interface module is used as part of a VM600^{Mk2} rack-based monitoring system.

The CPUM^{Mk2} module is always used with an associated IOCN^{Mk2} module as a pair/set of modules. Both the CPUM^{Mk2} and the IOCN^{Mk2} are single-width modules that occupy a single VM600^{Mk2} rack slot (module position). The CPUM^{Mk2} + IOCN^{Mk2} module can only be used in VM600^{Mk2} system racks (ABE04x).

When one CPUM^{Mk2} + IOCN^{Mk2} module is installed in a VM600^{Mk2} system rack as a standard rack controller and communications interface (no module redundancy), the CPUM^{Mk2} is installed in the front of a VM600^{Mk2} rack (typically slot 0) and the associated IOCN^{Mk2} is installed in the rear of the rack (typically slot 0), in the slot directly behind the CPUM^{Mk2}. Each module connects directly to the rack's backplane using two connectors.

When two CPUM^{Mk2} + IOCN^{Mk2} modules are installed in a VM600^{Mk2} system rack for rack-level communications redundancy, the "master" module is typically installed in slots 0 (front and rear) and the "subordinate" module is typically installed in slots 1 (front and rear).

Note: The CPUM^{Mk2} + IOCN^{Mk2} module is compatible with all VM600^{Mk2} system racks (ABE04x) and later VM600 system racks (ABE04x) with an I^{2}C interface (VME utility bus).

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

As a fieldbus communications interface for a VM600^{Mk2} monitoring system, the CPUM^{Mk2} module communicates with other VM600^{Mk2} processing modules in the rack (such as the MPC4^{Mk2} and/or future AMCx^{Mk2}) via the rack's VME bus and with XMx16 modules via a system Ethernet link in order to obtain measurement data and then share this information with third-party systems such as a DCS or PLC.

Note: The CPUM^{Mk2} is not compatible with first-generation VM600^{Mk1} cards such as the MPC4/IOC4T and AMC8/IOC8T card pairs.

The data shared via fieldbus can be the "raw" measurement data obtained from MPC4^{Mk2} or XMx16 modules, and/or the status (health) data obtained from the CPUM^{Mk2} modules, or the data can be further processed as required (defined by the fieldbus configuration file). For example, the processing supported includes basic mathematical functions such as arithmetic and logical operations, and many other supporting functions.

Note: The CPUM^{Mk2} can be used as a data communications gateway for XMx16 modules in low data-bandwidth applications. For example, handling hundreds of bytes of static data via Modbus TCP and/or PROFIBUS DP. However, the CPUM^{Mk2} cannot be used as a gateway for XMx16 modules in high data-bandwidth applications as the dynamic data (waveforms and spectra) generated by XMx16 modules typically requires a direct connection to the VibroSight$^®$ software.

As a rack controller for a VM600^{Mk2} monitoring system, the CPUM^{Mk2} module can manage the configuration of XMx16 + XIO16T modules that are operating without a VibroSight Server.
(Note: MPC4^{Mk2} + IOC4^{Mk2} modules are configured using the VibroSight$^®$ software.) The ALARM RESET button on the front panel of the CPUM^{Mk2} module can be used to clear the alarms latched by the monitoring modules (MPC4^{Mk2}) in the rack. This is a rack-wide equivalent of resetting alarms individually for each module using discrete signal interface alarm reset (AR) inputs or VibroSight$^®$ software commands.

A security key lock, with a removable key, on the front panel of the CPUM^{Mk2} module can be used to enable VM600^{Mk2} rack (CPUM^{Mk2}) security.

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DESCRIPTION *(continued)*

LEDs on the front panel of the CPUM^{Mk2} module (front of VM600^{Mk2} rack) indicate the mode of operation and status of the CPUM^{Mk2} + IOCN^{Mk2} module, and the status of its system Ethernet and fieldbus communications.

IOCN^{Mk2} module

The IOCN^{Mk2} module acts as a signal and communications interface for the CPUM^{Mk2} module. It also protects all inputs against electromagnetic interference (EMI) and signal surges to meet electromagnetic compatibility (EMC) standards.

LEDs on the front panel of the IOCN^{Mk2} module (rear of VM600^{Mk2} rack) indicate the status of its system Ethernet and fieldbus communications.

Fieldbus communications

The CPUM^{Mk2} + IOCN^{Mk2} module has two fieldbus interfaces (ports), FIELDBUS1 and FIELDBUS2, available on the IOCN^{Mk2} module (rear of VM600^{Mk2} rack).

The fieldbus ports allow the CPUM^{Mk2} module to act as a data communications gateway between a VM600^{Mk2} rack and external devices that use fieldbus networks. In order to do this, the CPUM^{Mk2} acts as a fieldbus server (slave) device that obtains data from the modules in the VM600^{Mk2} rack (MPC4^{Mk2} and XMx16 modules, and the CPUM^{Mk2} module itself) to share with fieldbus client (master) devices such as a DCS or PLC via one of the CPUM^{Mk2} + IOCN^{Mk2} module's fieldbus interfaces: Modbus TCP and/or PROFIBUS DP.

Each fieldbus port, FIELDBUS1 and FIELDBUS2, consists of two connectors, one for serial-based fieldbus standards and one for Ethernet-based. Both fieldbus ports can be active at the same time but only one connector can be used per interface/port (that is, connector J1 or J2 for FIELDBUS1, and connector J4 or J5 for FIELDBUS2).

In addition, the system Ethernet ports support Modbus TCP, which also allow the CPUM^{Mk2} module to share data from the other modules in the VM600^{Mk2} rack.

The data to be shared by fieldbus can be mathematically processed before it is shared and the results of "data freeze" detection can also be shared via fieldbus (defined by the fieldbus configuration file).

Rack-level communications redundancy

Rack-level communications redundancy (module redundancy) is obtained by using two functionally equivalent CPUM^{Mk2} + IOCN^{Mk2} modules in the same VM600^{Mk2} system rack (ABE04x).

Note: By default, during normal operation, the left-most CPUM^{Mk2} in the rack is considered the "master" module (active) and the other is the "subordinate" module (redundant).

The master CPUM^{Mk2} module uses the rack's VME bus to communicate with VM600^{Mk2} processing modules (MPC4^{Mk2} and/or future AMCx^{Mk2}) in the rack in order to obtain their measurement data and status information.

Only one CPUM^{Mk2} module, the master (active) module, can be master on the VME bus. Accordingly, the second CPUM^{Mk2} module, the subordinate (redundant) module is sent a copy of all information by the master (active) module. In this way, both CPUM^{Mk2} modules process and generate the fieldbus communication data based on the same source data, as defined by the CPUM^{Mk2} module(s) fieldbus configuration file.

If the master CPUM^{Mk2} module stops functioning for any reason (for example, due to module removal or failure), the subordinate CPUM^{Mk2} module will automatically take over with a maximum 200 ms required for the switch.

Note: Since a CPUM^{Mk2} module communicates data every 100 ms, one set of data can be "missing" on the control side (DCS or PLC) after a switchover.

Module redundancy with two CPUM^{Mk2} + IOCN^{Mk2} modules per VM600^{Mk2} system rack (ABE04x) enables true rack-level communications redundancy for critical applications where the cost of failure is high. It also allows for the implementation of complex communication configurations that require more than the two fieldbuses available per CPUM^{Mk2} + IOCN^{Mk2} module.

System communications

The CPUM^{Mk2} + IOCN^{Mk2} module has two system Ethernet interfaces (ports), ETHERNET1 and ETHERNET2, available on the IOCN^{Mk2} module (rear of VM600^{Mk2} rack).

Both system Ethernet ports provide the same functionality so one port is typically allocated for

DESCRIPTION *(continued)*

communications with the VibroSight® software while the other port is allocated for communications with monitoring modules such as the XMx16 + XIO16T.

VM600^{Mk2} rack (CPUM^{Mk2}) security

The CPUM^{Mk2} module supports features that can be used to limit the functionality of a VM600^{Mk2} rack's machinery protection system (MPS) that is available via the system Ethernet connections of the CPUM^{Mk2} + IOCN^{Mk2} module. Enabling VM600^{Mk2} rack (CPUM^{Mk2}) security helps to reduce the possibility of interference in the machinery protection function of the rack itself and in the machinery being monitored. Accordingly, CPUM^{Mk2} rack security makes it easier for operators to comply with international security/critical infrastructure regulations.

A security key lock on the front panel of the CPUM^{Mk2} module is used to enable or disable VM600^{Mk2} rack security as required. With security enabled, the CPUM^{Mk2} module will prevent (block) certain system operations such as the uploading of configurations and the sending of Modbus commands.

Relays

The CPUM^{Mk2} + IOCN^{Mk2} module includes two output relays to remotely indicate system status and alarm information. Each of the relays can be mapped to any Modbus bit variable and are typically used to signal a fault or a problem detected by a common alarm, such as communication status or rack status.

Software

The VibroSight® software supports the configuration and operation of VM600^{Mk2} systems, including CPUM^{Mk2} + IOCN^{Mk2} modules.

More specifically, for a CPUM^{Mk2} + IOCN^{Mk2} module, this involves using the VibroSight® software (specifically VibroSight Protect) to configure the network interface (IP address) and to configure the fieldbus interfaces via a fieldbus configuration file that is uploaded to the CPUM^{Mk2}.

To prioritise machinery protection functionality and help meet stringent cybersecurity and API 670 requirements, the MPC4^{Mk2} + IOC4^{Mk2} module segregates machinery protection (MPS) and condition monitoring (CMS) functionality by running separate module firmware using separate

configurations from different VibroSight configuration software:

- VibroSight Protect supports the configuration and operation of machinery protection system (MPS) functionality for a VM600^{Mk2} system (that is, for MPC4^{Mk2} + IOC4^{Mk2}, RLC16^{Mk2} and CPUM^{Mk2} + IOCN^{Mk2} modules).

- VibroSight Capture supports the configuration and operation of condition monitoring system (CMS) functionality for a VM600^{Mk2} system (that is, for MPC4^{Mk2} + IOC4^{Mk2} modules)

Other VibroSight software modules support operations such as data display and analysis (VibroSight Vision), data logging and post-processing (VibroSight Server) system maintenance (VibroSight System Manager), etc.

More generally for extended condition monitoring system (CMS) applications, the VibroSight software supports the configuration and operation of XMx16 + XIO16T modules for condition monitoring and/or combustion monitoring, including the processing and presentation of measurement data for analysis.

Refer to the *VibroSight® machinery monitoring system software data sheet* for further information.

Applications information

As part of a VM600^{Mk2} system, the CPUM^{Mk2} + IOCN^{Mk2} rack controller and communications interface module communicates with other VM600^{Mk2} modules in the rack (such as MPC4^{Mk2} and/or future AMCx^{Mk2}) in order to provide data aggregation and processing functionality, and then share this information with third-party systems such as a DCS or PLC via industry standard fieldbus interfaces.

The CPUM^{Mk2} + IOCN^{Mk2} can also provide a global alarm reset (AR) for the monitoring modules (MPC4^{Mk2}) in the rack. Accordingly, the CPUM^{Mk2} + IOCN^{Mk2} module is recommended for applications using multiple MPC4^{Mk2} + IOC4^{Mk2} modules in a VM600^{Mk2} rack.

The CPUM^{Mk2} + IOCN^{Mk2} module can also manage the configuration of XMx16 + XIO16T modules in certain applications, such as combustion monitoring control loops that use XMC16 + XIO16T modules.

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Further, module redundancy with two CPUM^{Mk2} + IOCN^{Mk2} rack controller and communications interface modules per VM600^{Mk2} system rack (ABE04x) can be used to either obtain true rack-level communications redundancy or implement complex communication configurations.

For further information, contact your local Parker Meggitt representative.

SPECIFICATIONS

Processing functions

- VM600^{Mk2} module data aggregation, processing and sharing (mathematical processing)

: Aggregation and processing of system data (measurement data and status information) from other VM600^{Mk2} modules in the rack (such as MPC4^{Mk2} + IOC4^{Mk2}) before sharing via fieldbus.
The further processing supported includes basic mathematical functions/operations such as arithmetic and logical operations, data selection, comparison, min/max and scaling functions, bit manipulation and packing/unpacking functions, and many others.
There is also a data freeze detection function that can be used to help detect if a data value has stopped being updated.

Note: Mathematical processing is defined by a CPUM^{Mk2} module fieldbus configuration file that is uploaded to the CPUM^{Mk2} using the VibroSight$^{®}$ software (VibroSight Protect).

- Fieldbus communications (data gateway)

: Acts as a fieldbus server (slave) device that obtains data from the modules in the VM600^{Mk2} rack (that is, from MPC4^{Mk2} + IOC4^{Mk2} modules, XMx16 + XIO16T modules and the CPUM^{Mk2} module itself) to share with fieldbus client (master) devices such as a DCS or PLC:
 • The CPUM^{Mk2} can act as a Modbus server and use the Ethernet fieldbus interfaces to share data via Modbus TCP.
 • The CPUM^{Mk2} can act as a PROFIBUS server and use the serial fieldbus interfaces to share data via PROFIBUS DP.
Note: The configuration of the fieldbus interfaces and the definition of the data to be shared via fieldbus is defined by a CPUM^{Mk2} module fieldbus configuration file that is uploaded to the CPUM^{Mk2} using the VibroSight$^{®}$ software (VibroSight Protect).

Note: It is important to note that Modbus TCP is currently supported via the system Ethernet interfaces (ports) – not via the fieldbus interfaces (ports).

- VM600^{Mk2} rack (system) communications

: Uses a VME communications link for communications with MPC4^{Mk2} + IOC4^{Mk2} modules (via the VME bus on the VM600^{Mk2} rack's backplane).
Uses a system Ethernet connection for communications with a computer running the VibroSight$^{®}$ software.
Uses another system Ethernet connection for communications with XMx16 modules (via an Ethernet cable external to the VM600^{Mk2} rack).

- Status monitoring

: Diagnostic log files record status (health) information for the CPUM^{Mk2} + IOCN^{Mk2} module.

Note: Diagnostic logs are downloaded from a CPUM^{Mk2} + IOCN^{Mk2} module using the VibroSight$^{®}$ software (VibroSight System Manager). This information is also available via a fieldbus interface.

- Alarm reset

: CPUM^{Mk2} front-panel button used to manually reset (clear) the latched alarms (and associated relays) for the MPC4^{Mk2} + IOC4^{Mk2} modules in the rack

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SPECIFICATIONS *(continued)*

- VM600^{Mk2} rack (CPUM^{Mk2}) security : A security key lock, with a removable key, on the front panel of the CPUM^{Mk2} module can be used to limit the functionality of the machinery protection system (MPS) that is available via the system Ethernet connections of the CPUM^{Mk2} + IOCN^{Mk2} module. This helps to reduce the possibility of interference in the machinery protection function of the rack itself and/or in the machinery being monitored.

- Status indication : CPUM^{Mk2} front-panel LEDs (front of VM600^{Mk2} rack) indicate the mode of operation and status of the CPUM^{Mk2} module, and the status of the Ethernet and fieldbus communications.
  IOCN^{Mk2} front-panel LEDs (rear of VM600^{Mk2} rack) indicate the status of the Ethernet and fieldbus communications.

- Relays : Two user-configurable CPUM^{Mk2} + IOCN^{Mk2} relays for the remote indication of system statuses and alarms.

  Note: Relays can be mapped to any Modbus bit variable.

- VM600 monitoring modules configuration management : Acts as a rack controller that manages the configuration of XMx16 + XIO16T modules, for applications that do not require a VibroSight Server.

Note: Refer to VM600^{Mk2} *machinery protection system (MPS) quick start manual* for further information.

Fieldbus interfaces

Number of channels	: Up to 2 fieldbus interfaces (ports). Ethernet and/or serial: Modbus TCP and/or PROFIBUS DP.
Data transfer	
• Modbus TCP	: Supports the following Modbus function codes: 01 (Read coils), 02 (Read discrete inputs), 03 (Read holding registers), 04 (Read input registers), 05 (Write single coil), 06 (Write single register), 15 (Write multiple coils) and 16 (Write multiple registers).

Performance level: Approx. 1000 16-bit value requests per second.

Note: It is important to note that Modbus TCP is currently supported via the system Ethernet interfaces (ports) – not via the fieldbus interfaces (ports).

- PROFIBUS DP : Up to 244 input bytes and 244 output bytes per fieldbus interface
- Modbus RTU : Not currently supported.

Communication interfaces

System communication interfaces – **Ethernet**

Number	: 2
Network interface	: 10/100/1000BASE-T(X) – Ethernet / Fast Ethernet / Gigabit Ethernet
Data transfer rate	: Up to 1000 Mbps (1 Gbps)
Distance between devices	: Up to 100 m at 1000 Mbps. For distances greater than the specified maximum (100 m), the interface will operate at reduced data transfer rates.
Protocols	: Meggitt TCP/IP proprietary protocol and Modbus TCP
Function	: VM600^{Mk2} module configuration and communications using the VibroSight® software and/or fieldbus Modbus TCP communications. XMx16 + XIO16T module configuration and communications (via CPUM^{Mk2} + IOCN^{Mk2} module using the VibroSight® software).
Connectors	: J6 (ETHERNET1) and J7 (ETHERNET2) on IOCN^{Mk2} module (see **Connectors on page 12**)

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SPECIFICATIONS *(continued)*

Fieldbus communication interfaces – **Ethernet**

Number	: 2
Network interface	: 10/100BASE-TX – Fast Ethernet
Data transfer rate	: Up to 100 Mbps
Distance between devices	: Up to 100 m
Protocols	: Meggitt TCP/IP proprietary protocol and Modbus TCP
Function	: Fieldbus Modbus TCP communications
Connectors	: J2 (FIELDBUS1) and J5 (FIELDBUS2) on IOCN^{Mk2} module (see **Connectors on page 12**)
Ethernet (fieldbus) isolation	: 1500 V$_{RMS}$

Fieldbus communication interfaces – **serial**

Number	: 2
Network interface	: RS-485 (half-duplex (2-wire)). RS-485 (full-duplex (4-wire)) subject to demand.
Data transfer rate	: Up to 12 Mbps, with automatic baud-rate detection
Distance between devices	: According to the relevant standard
Network topologies	: Point-to-point or linear (daisy-chained) for RS-485 networks
Protocols	: PROFIBUS DP: DP-V0 server (slave). Note: Modbus RTU is not currently supported.
Function	: Fieldbus PROFIBUS communications
Connectors	: J1 (FIELDBUS1) and J4 (FIELDBUS2) on IOCN^{Mk2} module (see **Connectors on page 12**)
RS-485 (fieldbus) isolation	: 700 V$_{RMS}$

Note: One serial fieldbus protocol (PROFIBUS DP) and up to two serial fieldbus interfaces are currently supported by the CPUM^{Mk2} + IOCN^{Mk2} module at any one time.

System communications

External	: System communication interfaces (Ethernet) for communication with VibroSight$^®$ software running on an external computer and/or XMx16 + XIO16T modules via external Ethernet cabling. See **System communication interfaces** – **Ethernet on page 7**.
Internal – VM600^{Mk2} VME	: VME bus interface (A24 / D16 master mode) for communication with controlling/processing modules via rack backplane. For example, with MPC4^{Mk2} + IOC4^{Mk2} monitoring modules.
	Note: The VME bus for the CPUM^{Mk2} + IOCN^{Mk2} module can be deactivated in order to allow two CPUM^{Mk2} + IOCN^{Mk2} modules to be installed in one VM600^{Mk2} system rack (ABE04x). This supports specific combined applications/solutions from a single VM600^{Mk2} rack. For example: • 1 × CPUM^{Mk2} + IOCN^{Mk2} module (VME enabled) with MPC4^{Mk2} + IOC4^{Mk2} modules – for machinery protection and/or condition monitoring. • 1 × CPUM^{Mk2} + IOCN^{Mk2} module (VME disabled) with XMC16 + XIO16T modules – for combustion monitoring. (The CPUM^{Mk2} + IOCN^{Mk2} and XMC16 + XIO16T communicate via system Ethernet.)

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External communication links / connections

- Connection to a computer/network : Either system communication interface (J6 or J7 connector on IOCN^{Mk2} module) can be used for connections/communications between the CPUM^{Mk2} + IOCN^{Mk2} module and a computer/network, using standard Ethernet cabling.

- Connection to VM600^{Mk2} modules : Either system communication interface (J6 or J7 connector on IOCN^{Mk2} module) can be used for connections/communications between the CPUM^{Mk2} + IOCN^{Mk2} module and XMx16 + XIO16T extended condition monitoring modules, using standard Ethernet cabling.
  See **System communication interfaces – Ethernet on page 7** and **Connectors on page 12**.

Notes

If both system communication interfaces of the CPUM^{Mk2} + IOCN^{Mk2} module are required by an application, that is, the J6 and J7 connectors are both used, then one should be allocated for communications with a computer/network and the other should be allocated for communications with XMx16 + XIO16T modules. Accordingly, a different subnet mask must be used for each interface/port in order to partition the networks used and ensure that the communications on each are kept separate from one another.

- Connection to a fieldbus (third-party system) : Either Ethernet fieldbus communication interface (J2 or J5 on IOCN^{Mk2} module) will be used for connections/communications between the CPUM^{Mk2} + IOCN^{Mk2} module and Ethernet-based fieldbuses (Modbus TCP) in the future, using standard Ethernet cabling.
  Note: Either system communication interface (J6 or J7 on IOCN^{Mk2} module) can also be used for connections/communications between the CPUM^{Mk2} + IOCN^{Mk2} module and Ethernet-based fieldbuses (Modbus TCP), using standard Ethernet cabling.

  Either serial fieldbus communication interface (J1 or J4 on IOCN^{Mk2} module) can be used for connections/communications between the CPUM^{Mk2} + IOCN^{Mk2} module and serial-based fieldbuses (PROFIBUS DP), using serial cabling.
  See **Fieldbus communication interfaces – serial on page 8** and **Connectors on page 12**.

Configuration

CPUM^{Mk2} + IOCN^{Mk2} module : Fully software configurable via Ethernet, using a computer running the VibroSight$^{®}$ software

Time synchronisation

Time reference for CPUM^{Mk2} : Network time protocol (NTP) server or CPUM^{Mk2} module's internal real-time clock (RTC) with battery backup

Protocol used between VM600^{Mk2} modules and computer : Network time protocol (NTP)

SPECIFICATIONS *(continued)*

Environmental

Temperature
- Operating
  : 0 to 65°C (32 to 149°F).
  Note: The maximum ambient temperature depends on the load on the IOCN^{Mk2} module's relays, as follows:
  - 65°C (149°F) max. for RL1 and RL2 contacts loaded with 2 A.
  - 45°C (113°F) max. for RL1 and RL2 contacts loaded with 5 A.
- Storage
  : −20 to 85°C (−4 to 185°F)

Humidity
- Operating
  : 0 to 90% relative humidity (RH), non-condensing
- Storage
  : 0 to 95% relative humidity (RH), non-condensing

Power supply overvoltage category (installation category)
: OVC II

Pollution degree
: 2

Indoor use
: Limited to indoor use only.
Note: The CPUM^{Mk2} + IOCN^{Mk2} module is designed for use in a VM600^{Mk2} ABE04x system rack and is suitable for indoor use only unless it is installed in an industrial housing or enclosure that ensures a higher level of environmental protection.

Altitude
: 2000 m (6560 ft) max.
Note: Reduced air density affects cooling ability.

Approvals

Conformity
: European Union (EU) declaration of conformity (CE marking)

Electromagnetic compatibility (EMC)
: EN 61000-6-2:2005.
EN 61000-6-4:2007 + A1:2011.
EN 61326-3-1:2013.

Electrical safety
: EN 61010-1:2010

Environmental management
: RoHS compliant (2011/65/EU)

Power supply (to CPUM^{Mk2} + IOCN^{Mk2})

Power source
: VM600^{Mk2} RPS6U rack power supply

Supply voltage
: 5 V$_{DC}$

Consumption
- CPUM^{Mk2}
  : 6.5 W
- IOCN^{Mk2}
  : 1 W

Total power consumption (CPUM^{Mk2} + IOCN^{Mk2} module)
: 7.5 W max.
Note: ≤ 6 W typ.

Control inputs (buttons)

CPUM^{Mk2}

ALARM RESET
: Used to reset all latched alarms (and associated relays) for all MPC4^{Mk2} + IOC4^{Mk2} modules in a VM600^{Mk2} rack

Security key lock
: Used to enable or disable VM600^{Mk2} rack (CPUM^{Mk2}) security, that is, limit any connections, such as VibroSight® software, to "read only" operations.
Note: Each CPUM^{Mk2} module is supplied with two keys for the lock.

ADMIN
: Reserved for future use

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SPECIFICATIONS *(continued)*

Relay characteristics

Number	: 2 × user-configurable relays (RL1 and RL2)
Type	: Single-pole double-throw (SPDT) / 1 Form C
Contact arrangement / connector	: 1 × COM, 1 × NC and 1 × NO contact per relay. J3 (RL1 and RL2) on IOCN^{Mk2} module (see **Connectors on page 12**).
Rated voltage	: 240 V$_{AC}$
Rated current	: 5 A
Maximum breaking capacity (without contact protection)	: 1250 VA

Maximum DC load breaking capacity curve:
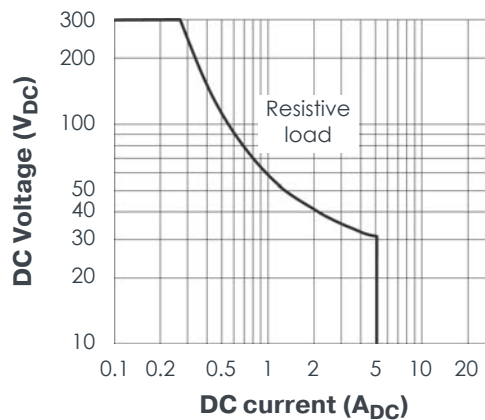
Operate / release time	: 5 / 2 ms typ.
Dielectric strength test voltages	
• Between open contacts	: 1 000 V$_{AC\,(RMS)}$
• Between contact and coil	: 4 000 V$_{AC\,(RMS)}$
Mechanical life	: 15 x 10^6 operations
Electrical life	: 10^4 operations

Note: In general, CPUM^{Mk2} + IOCN^{Mk2} module relays are limited to 240 V$_{AC}$ max. in accordance with the EN 61010 electrical safety standard.

⚠ **The CPUM^{Mk2} + IOCN^{Mk2} module's relays are not protective relays and must not be used for critical functions in machinery protection applications, such as initiating the shutdown (trip) of a machine.**

SPECIFICATIONS *(continued)*

Status indicators (LEDs)

CPUM^{Mk2}

• DIAG MODE1 and MODE2	: Indicates the mode of operation of the CPUM^{Mk2} module
• DIAG STATUS1 and STATUS2	: Indicates the status of the CPUM^{Mk2} module
• ETHERNET LINK/ACT1 and LINK/ACT2	: Indicates the status of the system Ethernet ports
• FIELDBUS LINK/ACT1 and LINK/ACT2	: Indicates the status of the fieldbus Ethernet ports
• FIELDBUS STATUS A1 and STATUS A2	: Helps to indicate the status of the fieldbus interfaces
• FIELDBUS STATUS B1 and STATUS B2	: Helps to indicate the status of the fieldbus interfaces

IOCN^{Mk2}

• J2 (FIELDBUS1)	: Separate Link and Activity LEDs to indicate the status of the fieldbus Ethernet link (FIELDBUS1)
• J5 (FIELDBUS2)	: Separate Link and Activity LEDs to indicate the status of the fieldbus Ethernet link (FIELDBUS2)
• J6 (ETHERNET1)	: Combined Link /Activity LED to indicate the status of the system Ethernet link (ETHERNET1)
• J7 (ETHERNET2)	: Combined Link /Activity LED used to indicate the status of the system Ethernet link (ETHERNET2)

Connectors

IOCN^{Mk2}

• J1 (FIELDBUS1)	: 9-pin D-sub connector (DCE), female. Serial-based fieldbus 1 for communication between the CPUM^{Mk2} + IOCN^{Mk2} module (fieldbus server) and a fieldbus client (master). Note: The J1 connection has functional insulation with a rated insulation voltage of 700 V_{RMS}.
• J2 (FIELDBUS1)	: 8P8C (RJ45) modular jack, female. Ethernet-based fieldbus 1 for communication between the CPUM^{Mk2} + IOCN^{Mk2} module (fieldbus server) and a fieldbus client (master). Note: The J2 connection is IEEE 802.3 Ethernet compatible and has functional insulation with a rated insulation voltage of 1500 V_{RMS}. Note: Reserved for future use.
• J3 (RL1 and RL2)	: 6-pin connector (male), compatible with 6-pin MC/STF plug-in connectors (female) with screw-terminal connections. Outputs (contacts) for relays RL1 and RL2. Note: Relays are configured using the fieldbus configuration file.
• J4 (FIELDBUS2)	: 9-pin D-sub connector (DCE), female. Serial-based fieldbus 2 for communication between the CPUM^{Mk2} + IOCN^{Mk2} module (fieldbus server) and a fieldbus client (master). Note: The J4 connection has functional insulation with a rated insulation voltage of 700 V_{RMS}.
• J5 (FIELDBUS2)	: 8P8C (RJ45) modular jack, female. Ethernet-based fieldbus 2 for communication between the CPUM^{Mk2} + IOCN^{Mk2} module (fieldbus server) and a fieldbus client. Note: The J5 connection is IEEE 802.3 Ethernet compatible and has functional insulation with a rated insulation voltage of 1500 V_{RMS}. Note: Reserved for future use.

SPECIFICATIONS *(continued)*

- J6 (ETHERNET1)
  : 8P8C (RJ45) modular jack, female.
  System Ethernet 1 for communication between the CPUM^{Mk2} + IOCN^{Mk2} module and either a computer or XMx16 + XIO16T modules.
  Note: The J6 connection is IEEE 802.3 Ethernet compatible and has functional insulation with a rated insulation voltage of 1500 V$_{RMS}$.

- J7 (ETHERNET2)
  : 8P8C (RJ45) modular jack, female.
  System Ethernet 2 for communication between the CPUM^{Mk2} + IOCN^{Mk2} module and either a computer or XMx16 + XIO16T modules.
  Note: The J7 connection is IEEE 802.3 Ethernet compatible and has functional insulation with a rated insulation voltage of 1500 V$_{RMS}$.

Notes

The IOCN^{Mk2} module's connectors are removable to simplify installation and mounting.

For the J3 connector:
- Clamping range (min. to max.): 0.14 to 1.5 mm^2 (28 to 16 AWG).
- Tightening torques (min. to max.): 0.2 to 0.25 N·m (0.15 to 0.18 lb-ft) for conductor screws,
  0.2 to 0.3 N·m (0.15 to 0.22 lb-ft) for mounting-flange screws.

The J3 connector provides 1 × COM, 1 × NC and 1 × NO contact per relay (RL1 and RL2).

Physical
CPUM^{Mk2}

- Height   : 6U (262 mm, 10.3 in)
- Width   : 20 mm (0.8 in)
- Depth   : 187 mm (7.4 in)
- Weight   : 0.40 kg (0.88 lb) approx.

IOCN^{Mk2}

- Height   : 6U (262 mm, 10.3 in)
- Width   : 20 mm (0.8 in)
- Depth   : 125 mm (4.9 in)
- Weight   : 0.25 kg (0.55lb) approx.

ORDERING INFORMATION

To order please specify

Type	Designation	Ordering number (PNR)
CPUM^{Mk2}	Different versions of the VM600^{Mk2} CPUM^{Mk2} processing module:	
	– Standard version	600-050
	The CPUM^{Mk2} ordering number PNR 600-050 corresponds to the underlying module version 600-050-000-vvv, where "vvv" represents the firmware (embedded software) and hardware versions that can be used by a finished product.	
IOCN^{Mk2}	Different versions of the VM600^{Mk2} IOCN^{Mk2} input/output module:	
	– Standard version	600-051
	The IOCN^{Mk2} ordering number PNR 600-051 corresponds to the underlying module version 600-051-000-vvv, where "vvv" represents the hardware versions that can be used by a finished product.	

Notes

Pre-configuration

Pre-configured VM600^{Mk2} CPUM^{Mk2} + IOCN^{Mk2} rack controller and communications interface modules are only available as part of a complete configured system (ordered using the VM600MK2SYS-based ordering number).

Conformal coating

VM600^{Mk2} CPUM^{Mk2} + IOCN^{Mk2} modules are also available with an optional conformal coating ("varnish") applied in order to provide additional environmental protection against chemicals, dust, moisture, etc. Contact Parker Meggitt for further information.

Redundant operation

Redundant operation of VM600^{Mk2} CPUM^{Mk2} + IOCN^{Mk2} modules in a VM600^{Mk2}/VM600 system rack requires that:
(1) Two VM600^{Mk2} CPUM^{Mk2} + IOCN^{Mk2} modules are installed in the rack.
(2) The two VM600^{Mk2} CPUM^{Mk2} + IOCN^{Mk2} modules are running firmware version 640-034-004-000 or later, corresponding to VibroSight 7.5.0 or later.

RELATED PRODUCTS

ABE04x	VM600^{Mk2}/VM600 system racks	: Refer to corresponding data sheet
MPC4^{Mk2} + IOC4^{Mk2}	VM600^{Mk2} machinery protection and condition monitoring module	: Refer to corresponding data sheet
RLC16^{Mk2}	VM600^{Mk2} relay module	: Refer to corresponding data sheet
XMx16 + XIO16T	VM600^{Mk2}/VM600 condition monitoring modules	: Refer to corresponding data sheet
VibroSight	VibroSight$^{®}$ machinery monitoring system software	: Refer to corresponding data sheet
CPUR2 and IOCR2	VM600 rack controller and communications interface card pair	: Refer to corresponding data sheet

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Parker Meggitt joined the Parker Aerospace Group in September 2022 following the successful acquisition of Meggitt PLC, a world leader in aerospace, defense and energy. This includes the Meggitt facility in Fribourg, Switzerland, operating as the legal entity Meggitt SA (formerly Vibro-Meter SA). Accordingly, the vibro-meter$^®$ product line is now owned by Parker.

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In this publication, a dot (.) is used as the decimal separator and thousands are separated by thin spaces. Example: 12345.67890.

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