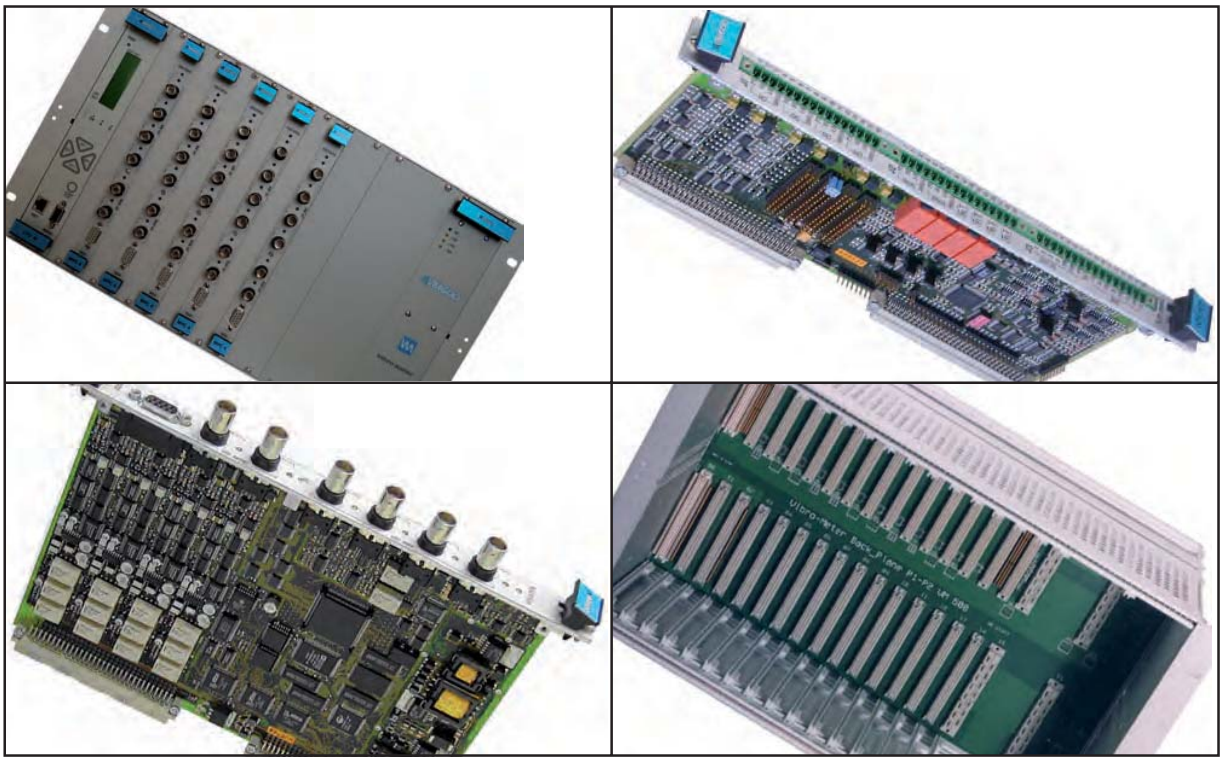
Vibro-Meter

QUICK REFERENCE GUIDE

for

Machinery Protection System (MPS)



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PREFACE

About this manual

This manual is a summary of how to install Vibro-Meter's VM 600 Series Machinery Protection System (MPS). It offers information concerning the installation and general use of this system.

This manual SHOULD be read in conjunction with the "reference installation manual" : VM 600 Machinery Protection System Hardware Manual (MAMPS-HW/E).

This manual SHOULD NOT be used as a replacement for the "reference installation manual", since the installation instructions in this manual are incomplete.

Who should use this manual ?

The manual is written for operators of process monitoring/control systems using the VM 600 Series Machinery Protection System.

The operator is assumed to have the necessary technical training in electronics and mechanical engineering (professional certificate/diploma, or equivalent) to enable him to install, program and use the MPS.

Applicability of the manual

The manual applies to MPS systems using the new generation of MPC 4 cards (hardware versions 03X, 11X, 21X and subsequent models). These cards are easily distinguished from earlier models as they have 7 LEDs on the front panel, whereas previous versions (01X and 02X) had only one LED (identified as DIAG).

Related publications and documentation

For further information on the use of the MPS, the operator is referred to one or more of the following software manuals (the choice depending on the customer's specific application) :

- VM 600 MPS Hardware Manual (Vibro-Meter Document No. MAMPS-HW/E)
- MPS1 Configuration Software for Machinery Protection System (Vibro-Meter Document No. MAMPS1-SW/E)
- MPS2 Configuration Software for Machinery Protection System (Vibro-Meter Document No. MAMPS2-SW/E)

Operators of networked MPS systems should also refer to the following document :

- VM 600 Series Networking Manual (Vibro-Meter Document No. MAVM600-NET/E)

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SAFETY

Symbols used in this manual

The following symbols are used in this manual where appropriate :

The WARNING safety symbol

THIS INTRODUCES DIRECTIVES, PROCEDURES OR PRECAUTIONARY MEASURES WHICH MUST BE EXECUTED OR FOLLOWED. FAILURE TO OBEY A WARNING CAN RESULT IN INJURY TO THE OPERATOR OR THIRD PARTIES.

The CAUTION safety symbol

This draws the operator's attention to information, directives or procedures which must be executed or followed. Failure to obey a caution can result in damage to equipment.

The ELECTROSTATIC SENSITIVE DEVICE symbol

This indicates that the device or system being handled can be damaged by electrostatic discharges. Refer to Section for further information.

NOTE : The NOTE symbol. This draws the operator's attention to complementary information or advice relating to the subject being treated.

Important remarks on safety

Read this manual carefully and observe the safety instructions before using the equipment described.

Additional remarks on safety

Every effort has been made to include specific safety-related procedures in this manual using the symbols described above. However, operating personnel are expected to follow all generally accepted safety procedures.

All personnel who are liable to operate the equipment described in this manual should be trained in the correct safety procedures.

Vibro-Meter does not accept any liability for injury or material damage caused by failure to obey any safety-related instructions or due to any modification, transformation or repair carried out on the equipment without written permission from Vibro-Meter. Any modification, transformation or repair carried out on the equipment without written permission from Vibro-Meter will invalidate any warranty.

Handling precautions for electrostatic sensitive devices

Certain devices used in electronic equipment can be damaged by electrostatic discharges resulting from built-up static electricity. Because of this, special precautions must be taken to minimize or eliminate the possibility of these electrostatic discharges occurring.

Read the following recommendations carefully before handling electronic circuits, printed circuit boards or modules containing electronic components.

- Before handling electronic circuits, discharge the static electricity from your body by touching and momentarily holding a grounded metal object (e.g. a pipe or cabinet).
- Avoid the build-up of static electricity on your body by not wearing synthetic clothing material, as these tend to generate and store static electric charges. Cotton or cotton blend materials are preferred because they do not store static electric charges.
- Do not handle electronic circuits unless it is absolutely necessary. Only hold modules by their front panel handles.
- Do not touch printed circuit boards, their connectors or their components with conductive devices or with your hands.
- Put the electronic circuit, printed circuit board or module containing electronic components into an antistatic protective bag immediately after removing it from the system rack.

1 INSTALLATION

This chapter provides a brief overview on the installation of Machine Protection System (MPS) hardware. Information is provided on unpacking, installing a rack, connecting power, connecting cards and software configuration.

NOTE : Further information can be found in the VM 600 MPS Hardware Manual (Vibro-Meter Document No. MAMPS-HW/E).

1.1 Unpacking and inspecting

The procedure for unpacking MSP Hardware is shown in Figure 1-1 and described below :

Step 1 : Place the outer box on a flat surface with the arrows on the side of the box pointing upwards

Step 2 : Open the outer box along the tape using a pair of scissors

Step 3 : Pull the handles of the inner box outwards to a vertical position

Step 4 : Gently lift the inner box vertically out of the outer box using the handles of the inner box

Step 5 : Place the inner box on a flat surface

Step 6 : Open the inner box using the handles

Step 7 : Inspect the MPS hardware to ensure that no damage has occurred during delivery

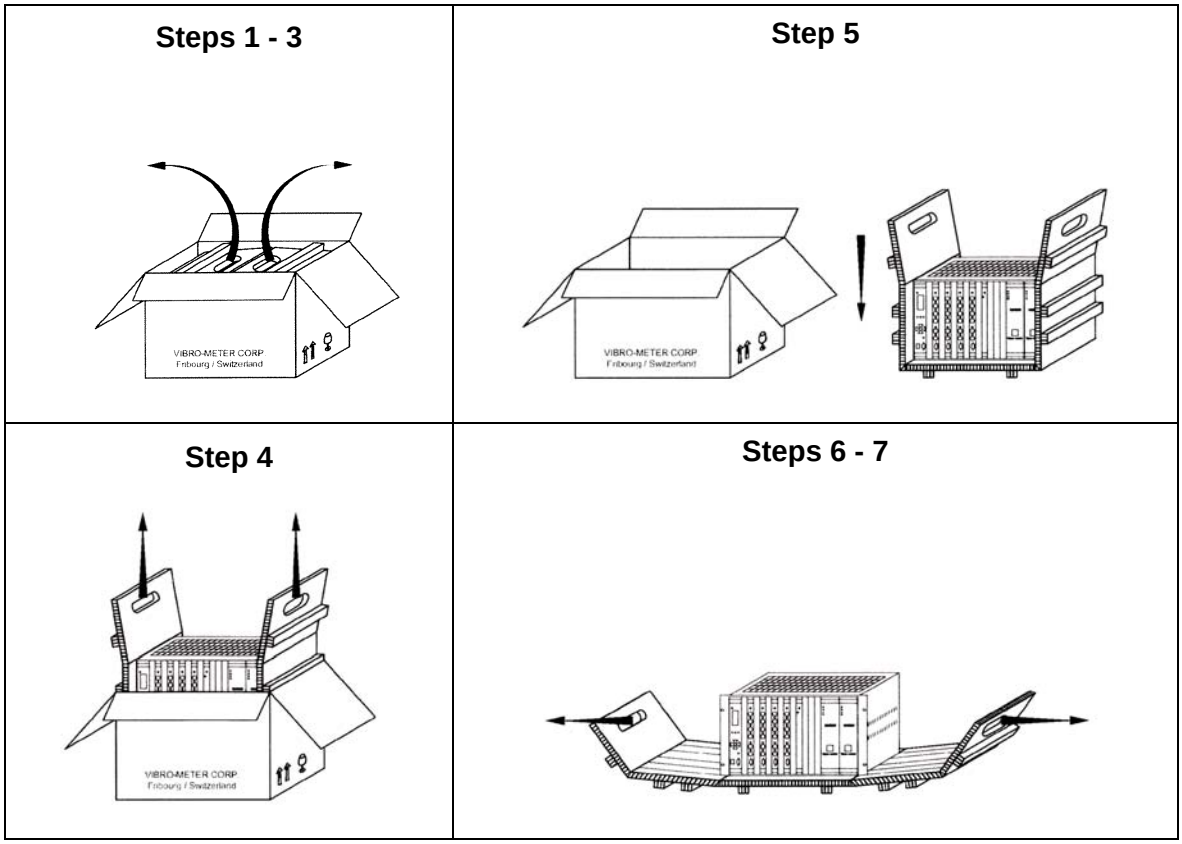


Figure 1-1 : Procedure for unpacking and inspecting MPS Hardware

NOTE : If damage has occurred to the MPS hardware during delivery, please contact your nearest Vibro-Meter representative.

1.2 System overview

MPS is a digital Machinery Protection System designed for use in industrial applications. It is intended principally for vibration monitoring to assure the protection of rotating machinery as used in, for example, the power generation, petro-chemical and petroleum industries as well as in marine related applications.

Vibro-Meter's VM 600 series of machinery protection and monitoring systems are based around a rack (19" x 6U) containing various types of cards depending on the application. There are two types of system :

- MPS
- CMS (Condition monitoring system)

It is possible to integrate MPS and CMS hardware into the same rack.

NOTE : This manual describes MPS hardware only. Further information on CMS hardware can be found in the VM 600 Series Condition Monitoring System (CMS) Hardware Manual (MACMS-HW/E).

In its most basic configuration, the MPS consists of the following hardware :

1- ABE 04X Rack assembly (19" x 6U)

2- RPS 6U Rack power supply unit

3- MPC 4 Machinery protection card

4- IOC 4T Input/output card matching the MPC 4

5- AMC 8 Analog monitoring card

6- IOC 8T Input/output card matching the AMC 8

The MPC 4 and IOC 4T cards form an inseparable pair and one cannot be used without the other. These cards are used principally for vibration monitoring.

Likewise, the AMC 8 and IOC 8T cards form an inseparable pair. These cards are used principally for monitoring quasi-static parameters such as temperature, fluid level or flow rate.

A rack can contain :

- Only MPC 4 / IOC 4T card pairs
- Only AMC 8 / IOC 8T card pairs
- A combination of MPC 4 / IOC 4T and AMC 8 / IOC 8T card pairs

Depending on the application, the following type of card can also be installed in the rack :

7- RLC 16 Relay card (16 relays)

All the above items can be used to make a stand-alone MPS system, i.e. one that is not connected to a network.

A networked version of the MPS contains the following additional hardware in the ABE 04X rack :

8- CPU M Modular CPU card

9- IOC N Input/output card (matching the CPU M)

Depending on the application (and irrespective of whether the rack is used in a stand-alone or a networked configuration), one or more of the following low-noise power supplies may be used outside the rack :

- APF 195 DC-DC Converter
- APF 196 AC-DC Converter (can also be used as a DC-DC Converter)
- Any equivalent low-noise power supply provided by the customer

These devices must be used for GSI 1XX galvanic separation units, GSV 14x safety barriers and transducer / conditioner front-ends having a current requirement greater than 25 mA. They will often be mounted in the cubicle in which the rack is installed.

Figure 1-2 and Figure 1-3 show front and rear views of a typical MPS rack.

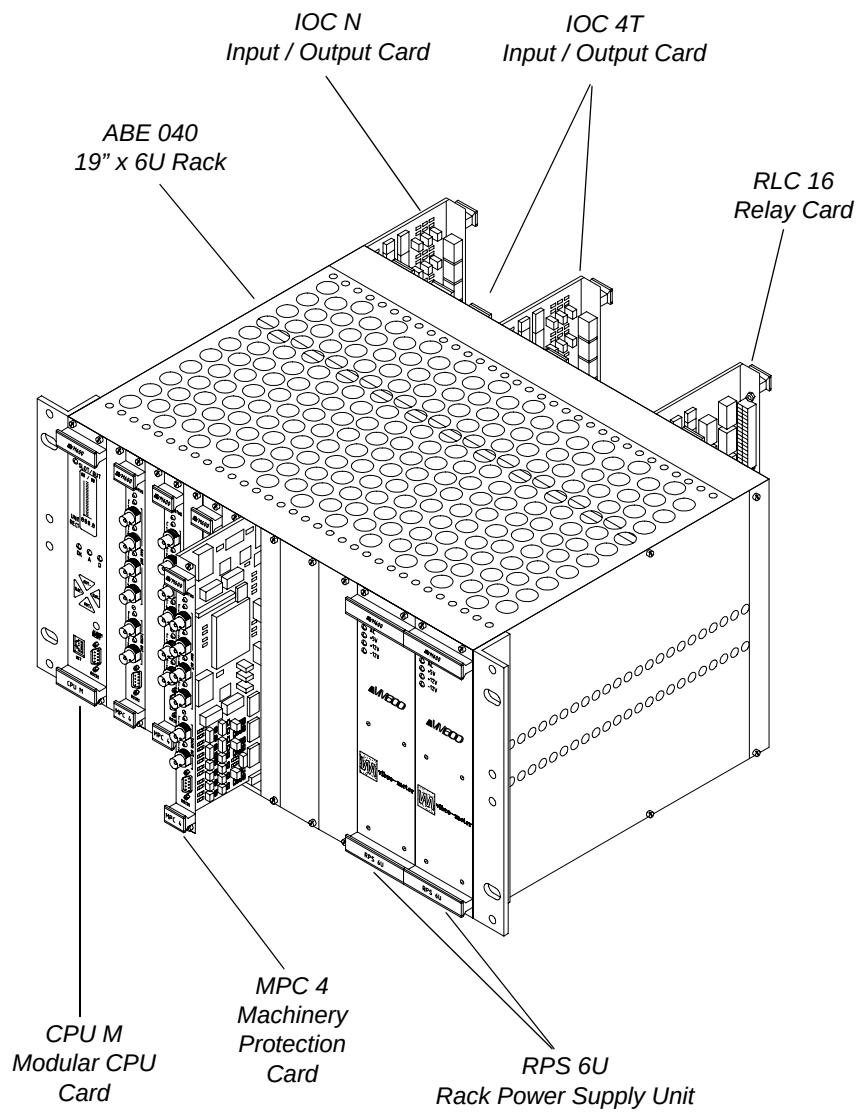


Figure 1-2 : Front view schematic of a typical MPS system (featuring MPC 4 / IOC 4T card pairs)

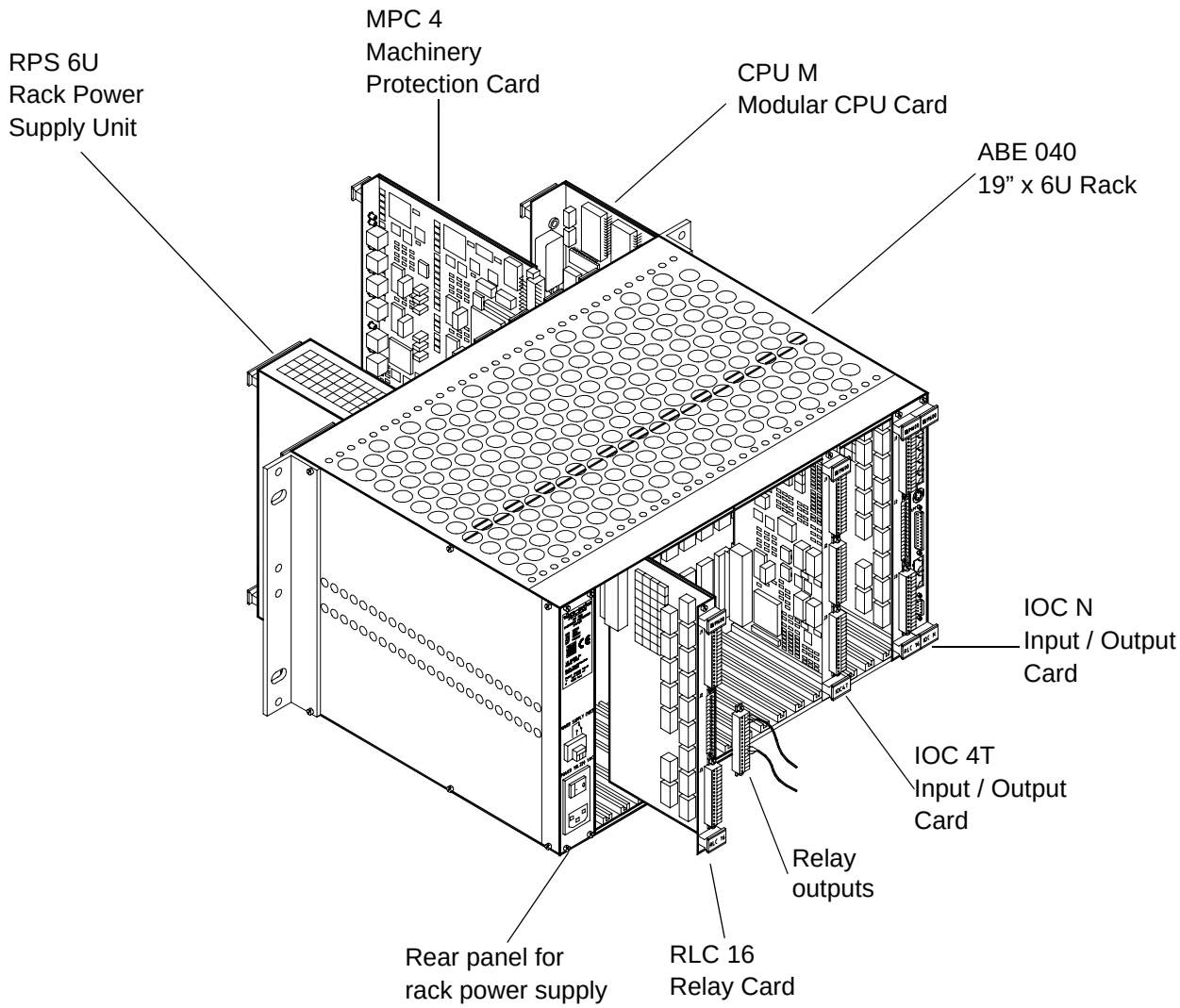


Figure 1-3 : Rear view schematic of a typical MPS system (featuring MPC 4 / IOC 4T card pairs)

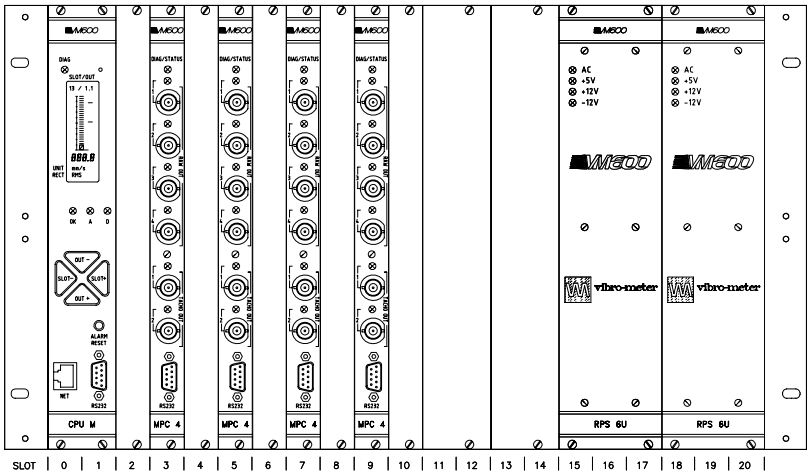
NOTE : Further specific information on installing MPS hardware can be found in the VM 600 MPS Hardware Manual (Vibro-Meter Document No. MAMPS-HW/E) and in the corresponding data sheet.

1.3 Installing a rack

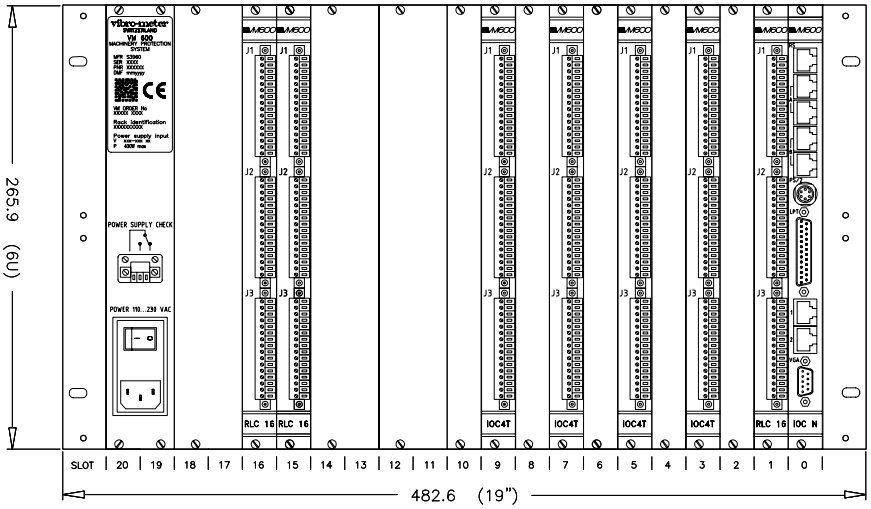
The MPS is housed in a 19-inch rack (84TE) having a height of 6U (6HE). Two rack types exist : the ABE 040 and the ABE 042. These are identical, except for the position of the rack mounting brackets. An example of an MPS housed in an ABE 040 rack is shown in Figure 1-4.

The ABE 040 contains a front and a rear card cage. The card cages are separated by the rack backplane. The appearance of the front and rear panels of the rack depends entirely on the types of cards installed in the two card cages.

Front View



Rear View



Side View

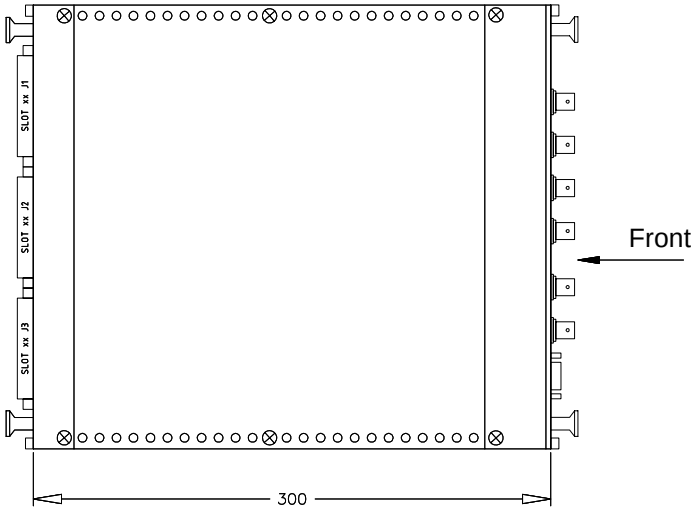


Figure 1-4 : Views of a typical ABE 040 rack with several cards installed

1.3.1 Ventilation

The 19" x 6U racks (types ABE 04x) do not contain any ventilation units (fans). They therefore rely on either forced ventilation by fans in the cabinet or on natural ventilation (convection) for their cooling. Both require the free flow of air in an upward direction, with air entering the rack through the vents in the base of the rack and leaving it through the vents on the top of the rack. When racks are installed in a cabinet or enclosure, in which natural ventilation is used, a space of at least 50 mm should be present below and above each rack (see Figure 1-5, Case A).

It is possible to prevent warm air flowing from one rack to another, by placing inclined plates between them (see Figure 1-5, Case B). A space of 50 mm should be present below and above each rack.

Always ensure adequate spacing (minimum 50 mm) is provided below and above the rack to allow proper natural ventilation.

The rack will overheat if this is not done. This will affect the correct operation of the system.

If a rack is assembled without empty slots between the processing cards (MPC or CMC), it is recommended to use forced ventilation if the temperature of the air flowing through the rack exceeds 40°C. If the rack has at least one empty slot between each processing card, it is recommended to use forced ventilation if the temperature of the air flowing through the rack exceeds 55°C.

1.3.2 Circuit breaker

In a case where forced ventilation by fan units is used, the spacing above, below and between racks may be reduced to zero, providing that the air flow to/from neighbouring racks is ensured.

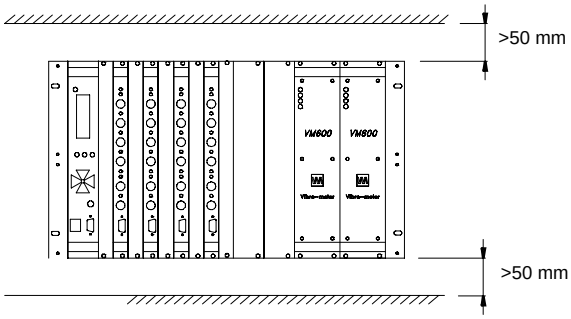
In some circumstances the operator must ensure a switch or circuit breaker is provided in order to comply with the IEC 1010 standard. This standard stipulates that permanently connected equipment (such as an ABE 04X rack) must employ a switch or circuit breaker as a means of disconnection from the mains supply.

ABE 04X racks employing an AC version of the RPS 6U power supply already have an ON/OFF switch at the back of the rack. However, this is not the case for the DC versions of the RPS 6U.

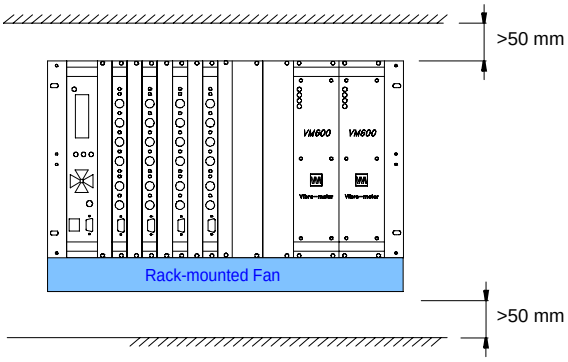
If the ABE 04X rack employs a DC version of the RPS 6U power supply, you must ensure that the power cable linking the rack to the mains supply passes through a switch or circuit breaker.

Case A

Natural ventilation



Forced ventilation



Case B

Natural ventilation

Forced ventilation

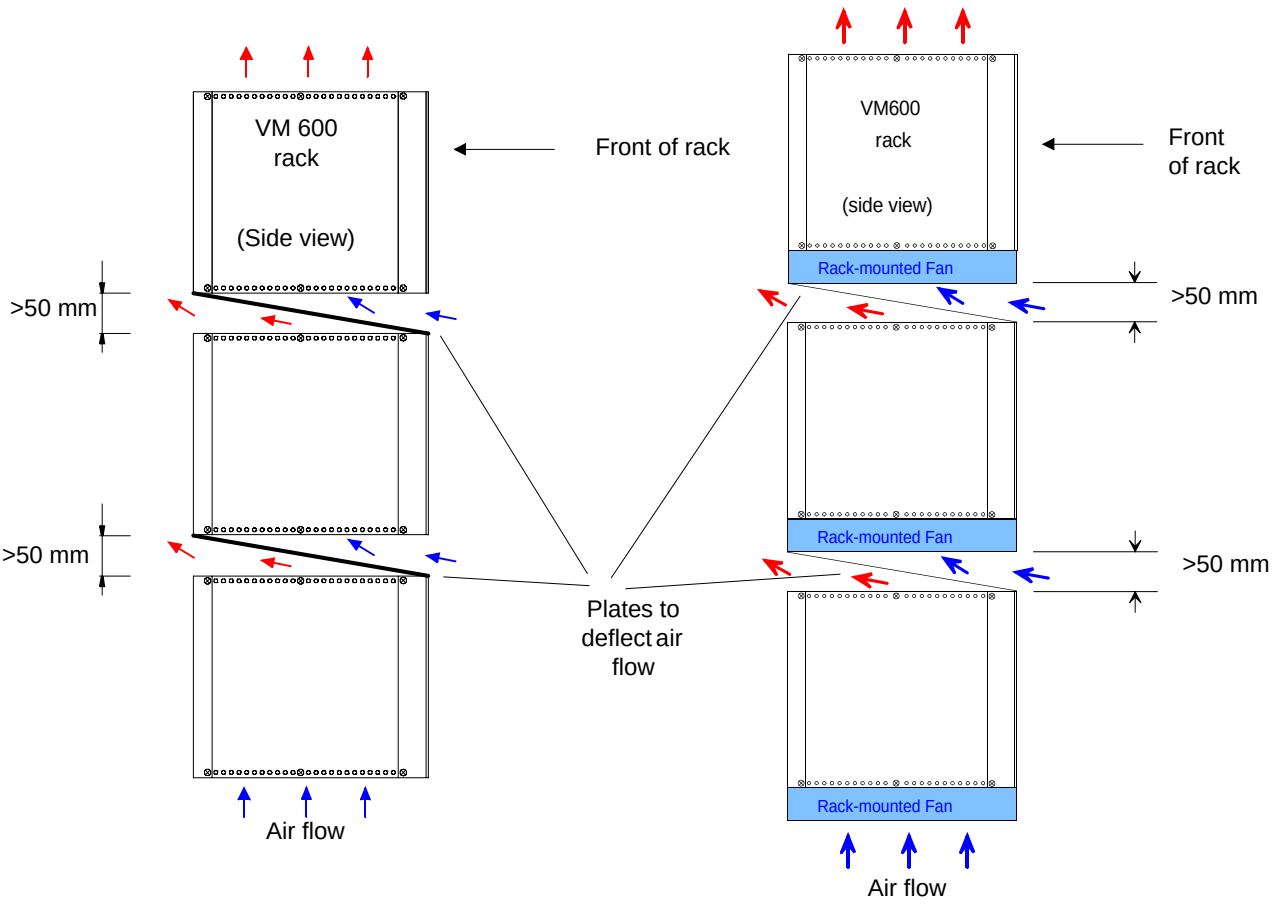


Figure 1-5 : Minimum required spacing below, above and between racks in an enclosure using natural or forced ventilation

1.4 Connecting power

The following versions of the RPS 6U unit are available :

- An RPS 6U unit intended for use with an AC mains supply.
- An RPS 6U unit intended for use with a DC mains supply.

These units are distinguished by the presence of an AC or DC LED

One or two RPS 6U units may be installed in a rack, depending on the number of cards. If two are present, this is known as a “redundant" configuration.

The RPS 6U unit must be used with an appropriate connection panel mounted at the rear of the rack. Several types of these associated rear panels exist. They allow the connection of AC and/or DC mains power to the rack.

NOTE : Further specific information on power supplies can be found in the corresponding datasheets.

1.4.1 How to connect power to a VM 600 rack

1.4.1.1 AC versions

Figure 1-6 shows the front and rear panels of AC versions of the RPS 6U unit.

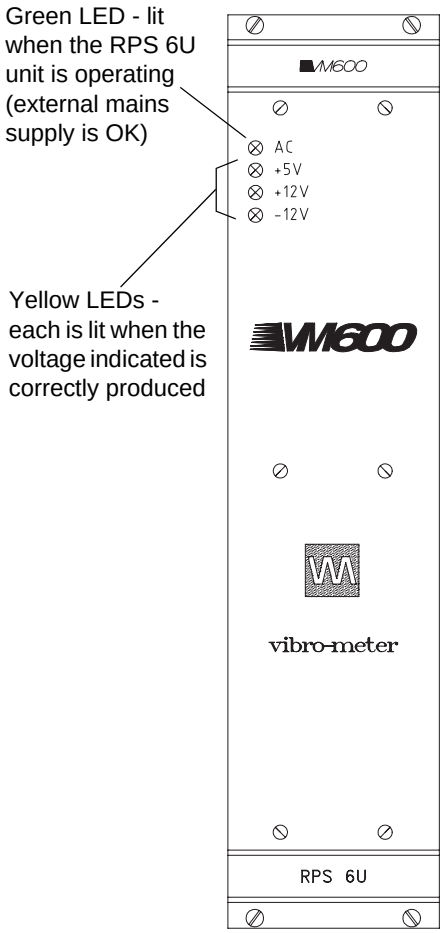
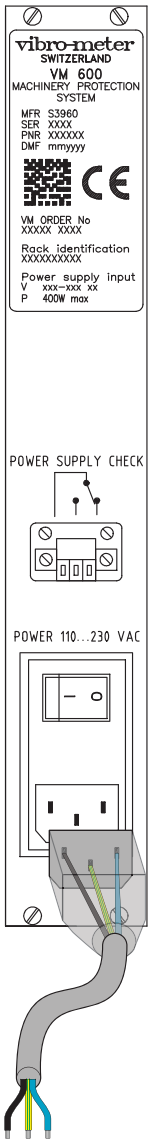
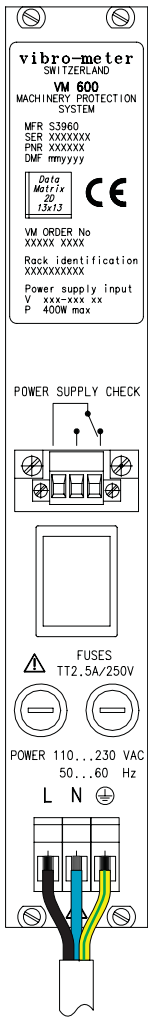
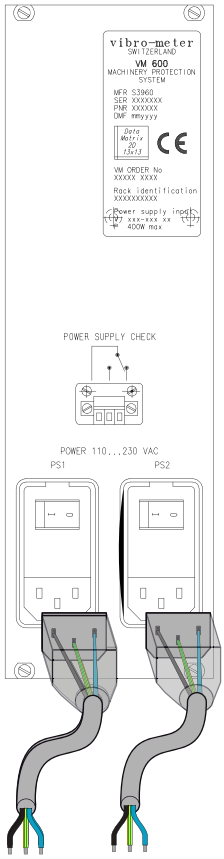
Front panel	Back panels		
	Single AC supply	**Single AC supply + strip connectors**	**Dual AC supply**
	110 - 230 VAC	110 - 230 VAC	110 - 230 VAC
	50 - 60 Hz	50 - 60 Hz	50 - 60 Hz
			

Figure 1-6 : Front and rear panels of AC versions of RPS 6U unit

1.4.1.2 DC versions

Figure 1-7 shows the front and rear panels of DC versions of the RPS 6U unit.

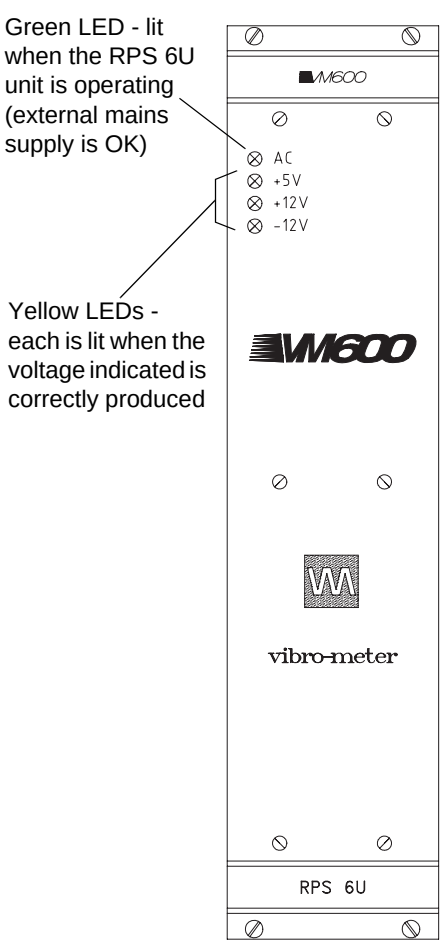
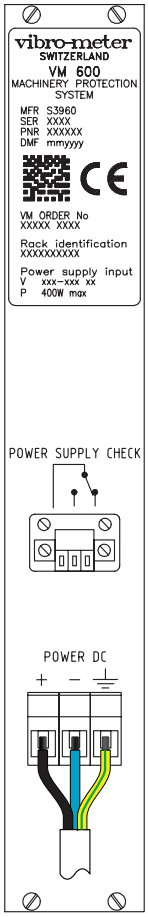
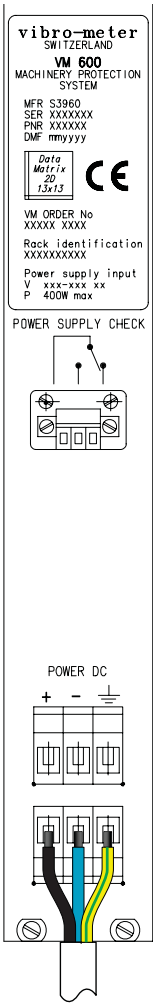
Front panel	Back panels	
	Single DC supply	**Dual DC supply**
	24, 48, 72 or 110 VDC	24, 48, 72 or 110 VDC
		

Figure 1-7 : Front and rear panels of DC versions of RPS 6U unit

1.4.1.3 AC and DC Version

Figure 1-8 shows the front and rear panels of the independent AC and DC version of the RPS 6U unit.

Front panels	Back panel	
	Single AC supply	**Single DC supply**
	110 - 230 VAC	24, 48, 72 or 110 VDC
	50 - 60 Hz	

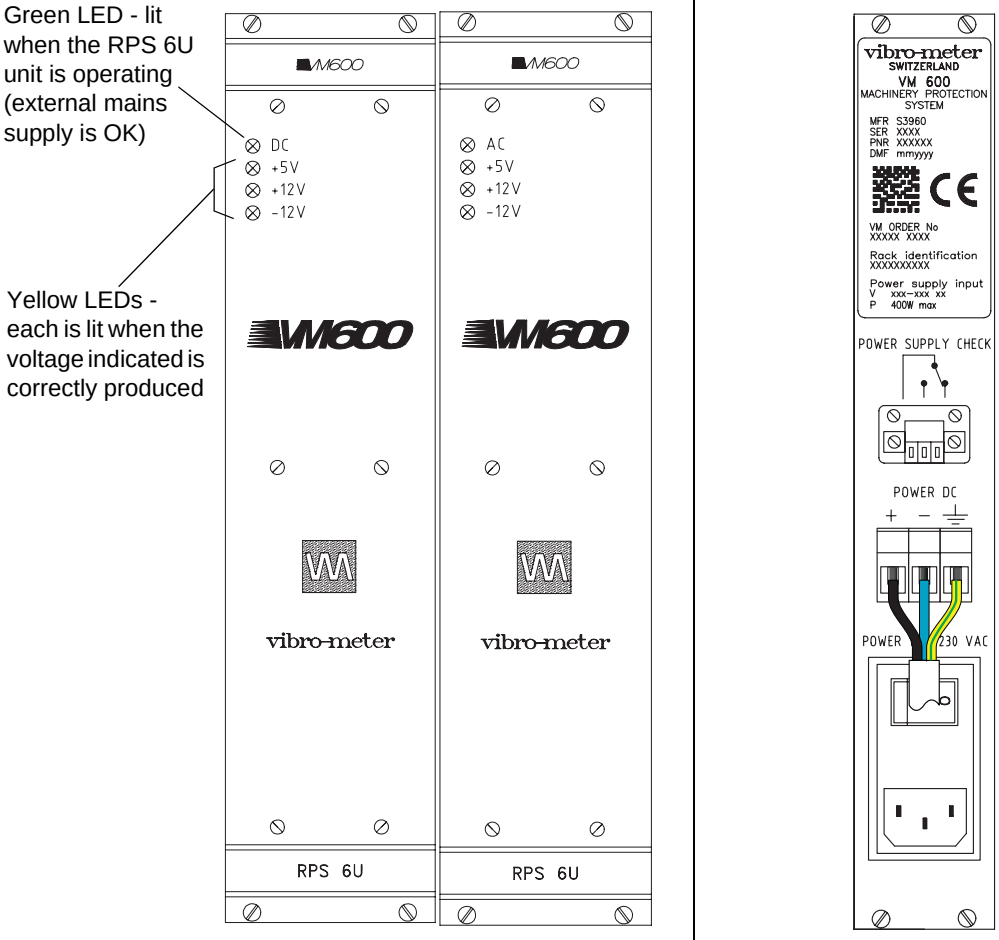


Figure 1-8 : Front and rear panels of the RPS 6U unit with independent AC and DC supplies

1.4.2 The power supply check relay

The power supply relay check relay on the rear panel provides an indication that the +5 V, -12 V and +12 V supplies are being correctly delivered by the RPS 6U unit(s) to the backplane. The relay has 3 terminals, defined from left to right as Common, Normally Open (NO) and Normally Closed (NC), as shown in Figure 1-9. The other components shown in the diagram are mounted on the rack backplane.

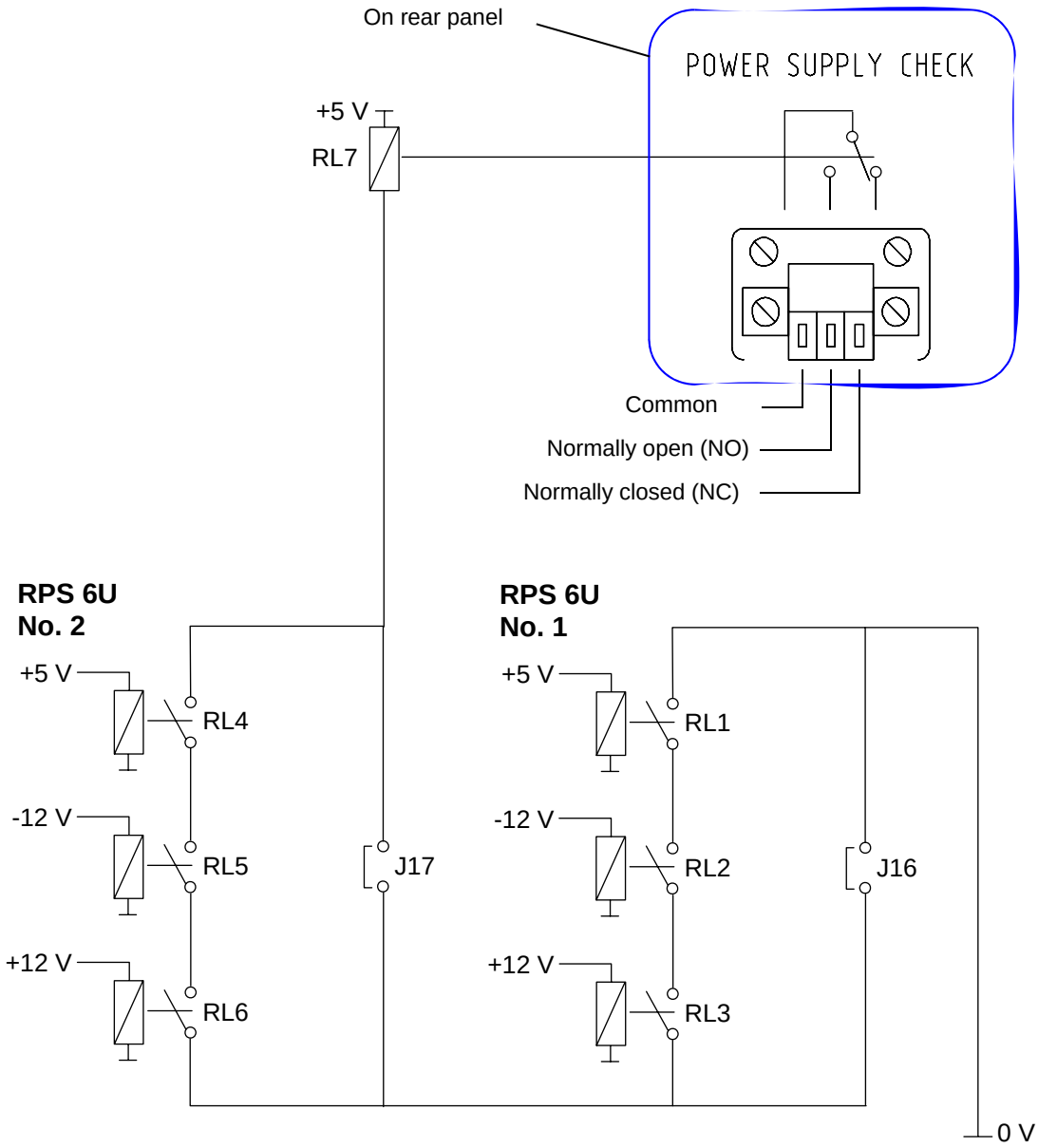


Figure 1-9 : Operation of POWER SUPPLY CHECK relay

1.5 Connecting devices

Operating personnel should remember to observe the handling precautions mentioned in Handling precautions for electrostatic sensitive devices on page x when handling cards.

Failure to do this may result in cards becoming damaged by electrostatic discharges.

Before inserting a card in the rack, check visually that none of the connector pins are bent.

1.5.1 Device locations

The MPS is a modular system with 21 VME slots, designated Slot 0 to Slot 20 (from left to right, as seen from the front).

The front and rear card cages of the rack are partitioned by a back plane. Each side of the back plane is equipped with connectors allowing modules and cards to be quickly and easily installed.

The following elements are connected to the backplane by installing them from the **front** of the rack :

- AMC 8 Analog monitoring card
- MPC 4 Machinery protection card
- CMC 16 Condition monitoring card
- CPU M Modular CPU card
- RPS 6U Mains power supply unit

The following elements are connected to the backplane by installing them from the **rear** of the rack :

- IOC 8T Input/output card (matching AMC 8)
- IOC 4T Input/output card (matching MPC 4)
- IOC 16T Input/output card (matching CMC 16).
- IOC N Input/output card (matching CPU M)
- RLC 16 Relay card

NOTE : Further information on CMS hardware can be found in the following document :
VM 600 *Series Condition Monitoring System (CMS) Hardware Manual*
Vibro-Meter Document No. MACMS-HW/E.

1.5.2 Installation restrictions

The following installation restrictions apply :

<table>
<tr><th>VME Slot No.</th><th>Unit / card accepted in front card cage</th><th>Card accepted in rear card cage</th></tr>
<tr><td>0</td><td rowspan="2">Reserved for CPU M</td><td>Reserved for IOC N</td></tr>
<tr><td>1</td><td rowspan="2">RLC 16</td></tr>
<tr><td>2</td><td>Reserved for VME 32 card</td></tr>
<tr><td>3</td><td rowspan="12">MPC 4, AMC 8 or CMC 16</td><td rowspan="12">IOC 4T, IOC 8T or IOC 16T (respectively) or RLC 16</td></tr>
<tr><td>4</td></tr>
<tr><td>5</td></tr>
<tr><td>6</td></tr>
<tr><td>7</td></tr>
<tr><td>8</td></tr>
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<tr><td>11</td></tr>
<tr><td>12</td></tr>
<tr><td>13</td></tr>
<tr><td>14</td></tr>
<tr><td>15</td><td rowspan="3">RPS 6U unit PS2 (Width of one unit = 3 slots)</td><td rowspan="3">RLC 16</td></tr>
<tr><td>16</td></tr>
<tr><td>17</td></tr>
<tr><td>18</td><td rowspan="3">RPS 6U unit PS1 (Width of one unit = 3 slots)</td><td rowspan="3">Reserved for rear panel of RPS 6U unit</td></tr>
<tr><td>19</td></tr>
<tr><td>20</td></tr>
</table>

Table 1-1 : Attribution of slots in the rack

Notes :

- An MPC 4 card must have an IOC 4T card installed directly behind it in the rack
- An AMC 8 card must have an IOC 8T card installed directly behind it in the rack
- A CMC 16 card must have an IOC 16T card installed directly behind it in the rack
- When more than 9 slots are occupied, between positions 3 and14, then two RPS 6U power supply modules must be mounted in the VM 600

When an MPS is installed for the first time, the pairs of MPC 4 / IOC 4T cards and AMC 8 / IOC 8T cards within it must be configured according to their intended application.

The IOC 4T and IOC 8T cards have adjustable hardware elements (micro-switches and jumpers) that have to be set up before insertion in the rack. The elements on the IOC 4T and IOC 8T cards are normally configured in the factory before delivery of the MPS.

NOTE 1 : If you are unsure how to change micro-switches and jumpers, then please contact your local Vibro-Meter representative. Failure to do this may invalidate your warranty.

NOTE 2 : Information on card configurations can be found in the VM 600 Machinery Protection System Hardware Manual (MAMPS-HW/E).

1.6 Communicating with the MPS

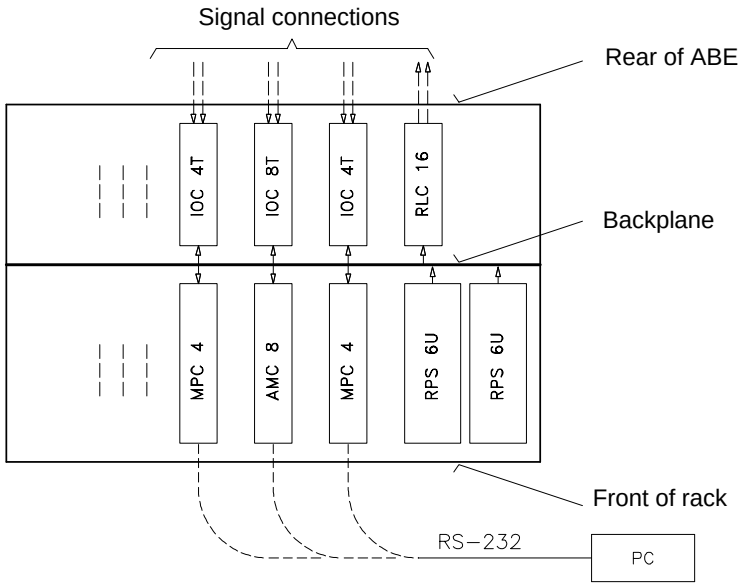
The MPS may be configured in several ways, depending on the hardware installed in the ABE 04X rack. Figure 1-10 shows the various possibilities for communicating with the system. In all cases, one of the MPS software packages (MPS1 or MPS2) is required to perform the configuration.

Figure 1-10 (a) shows the simplest MPS configuration. This is a stand-alone rack, i.e. one not containing a CPU M card. In this case, each MPC 4 or AMC 8 card in the rack must be programmed individually from a personal computer over an RS-232 link (refer to : 1.7 - Connecting to a PC, page 1.17.

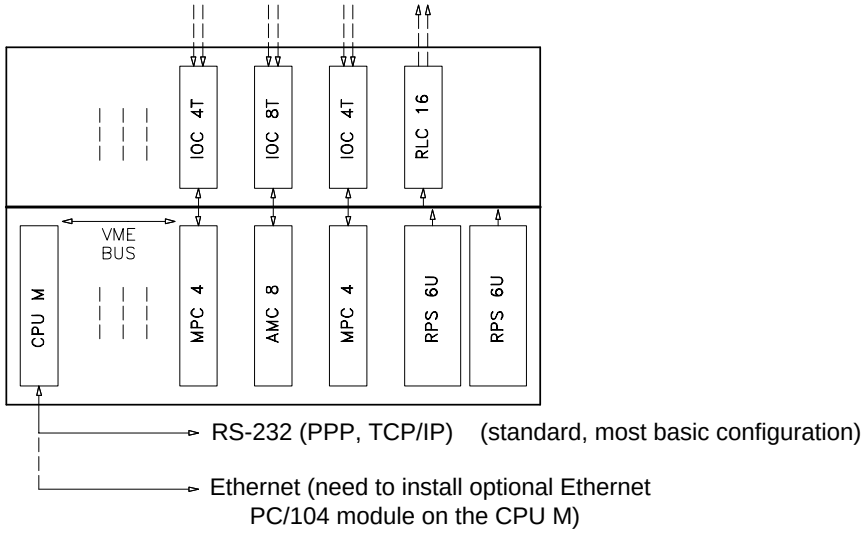
Figure 1-10 (b) shows a rack containing a modular CPU card (type CPU M). An Ethernet link may be established between the personal computer and the MPS via this card. The connection is made on the front panel of the CPU M, hence at the front of the rack. Communication between the CPU M and the MPC 4 / IOC 4T pair or the AMC 8 / IOC 8T pair takes place over a VME bus on the rack backplane.

Figure 1-10 (c) shows a rack containing a modular CPU card (type CPU M) and the matching IOC N input / output card. A connection may be established between the personal computer and the MPS via the IOC N using a Ethernet connector (TCP), RS-232 connector or RS-485/422 connector. The connection is made on the IOC N panel, hence at the rear of the rack. Communication between the IOC N / CPU M pair and the MPC 4 / IOC 4T pair or the AMC 8 / IOC 8T pair takes place over a VME bus on the rack backplane.

a)



b)



c)

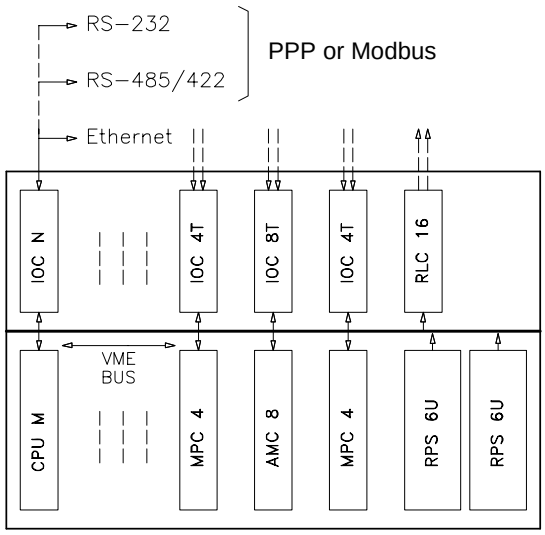


Figure 1-10 : Methods of communicating with the MPS

1.7 Connecting to a PC

The MPC 4 and AMC 8 cards have 9-pin Sub-D RS-232 connectors. This can be used to configure cards in a stand-alone rack. This is achieved using an interface cable from a personal computer running one of the MPS configuration software packages. Details of the interface cable connections are shown in Figure 1-11.

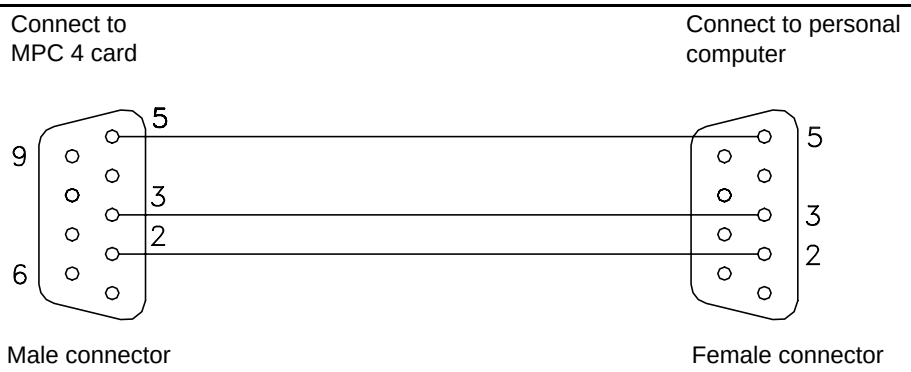


Figure 1-11 : Interface cable used to connect the MPC 4 or AMC 8 card to the serial port of a personal computer running the configuration software

1.8 Software configuration

The configuration of individual channels on the MPC 4 and AMC 8 cards must be made using software before the system can be used. One of the MPS software configuration packages (e.g. MPS1 or MPS2) should be used to do this once the rack is powered up. For a stand-alone rack, the configuration can be downloaded from a PC to each MPC 4 and/or AMC 8 card in turn via an RS-232 link (refer to : 1.7 - Connecting to a PC, page 1.17). Alternatively, if the rack contains a CPU M card (and, optionally, its matching IOC N card), the configuration can be downloaded over an Ethernet link.

The majority of parameters are normally configured in the factory before delivery. The user is nevertheless able to modify certain parameters if required using one of the MPS software packages.

NOTE : Refer to *MPS1 Configuration Software for Machinery Protection System* (Vibro-Meter Document No. MAMPS1-SW/E) or *MPS2 Configuration Software for Machinery Protection System* (Vibro-Meter Document No. MAMPS2-SW/E) for further information.

1.9 Setting the IP address of the CPU M card

The IP address of the CPU M must be defined for racks employing this type of card.

Unless otherwise specified at the time of ordering, each CPU M is given an IP address of 10.10.56.56 in the factory before delivery of the MPS system. It is strongly recommended to change this IP address. This is done using a VT100 terminal (or emulator from the Windows environment).

NOTE : Refer to the VM 600 *Networking Manua*l for further information. (Vibro-Meter Document No. MAVM600-NET/E).

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2 OPERATING THE SYSTEM

This chapter provides a brief overview of the operation of MPS hardware. Functional information is also given for certain elements (such as connectors, LEDs and buttons).

NOTE : Further information can be found in the VM 600 MPS Hardware Manual (Vibro-Meter Document No. MAMPS-HW/E).

2.1 Device operation

2.1.1 MPC 4 machinery protection card

Figure 2-1 shows an MPC 4 machinery protection card and describes the meaning of the LEDs.

An MPC 4 card has 3 connectors :

1- BNC connectors RAW OUT 1 to RAW OUT 4

2- BNC connectors TACHO OUT 1 and TACHO OUT 2

3- RS-232 connector

NOTE : For further information on connecting to a PC, refer to : 1.7 - Connecting to a PC, page 1.17.

An MPC 4 card has the following LEDs :

1- One global DIAG / STATUS indicator for the MPC 4 / IOC 4T card pair

2- Status indicators for the 4 measurement channels and the 2 rotational speed channels

NOTE : For further information refer to the document : VM 600 Series Condition Monitoring System (CMS) Hardware Manual (MACMS-HW/E).

2.1.2 IOC 4T input / output card

Figure 2-2 shows an IOC 4T input / output card and describes the meaning of the LED a) without mating connectors and b) when mating connectors are inserted. An IOC 4T card has 3 connectors : J1, J2 and J3 and slot error indicator LED on the front panel.

NOTE : For further information refer to the document : VM 600 Series Condition Monitoring System (CMS) Hardware Manual (MACMS-HW/E).

2.1.3 AMC 8 analog monitoring card

Figure 2-3 shows an AMC 8 analog monitoring card and describes the meaning of the LEDs.

An AMC 8 card has an RS-232 connector.

NOTE : For further information on connecting to a PC, refer to : 1.7 - Connecting to a PC, page 1.17.

An AMC 8 card has the following front panel LEDs :

1- One global DIAG / STATUS indicator for the AMC 8/IOC 8T card pair

2- Status indicators for the 8 measurement channels

NOTE : For further information refer to the document : VM 600 Series Condition Monitoring System (CMS) Hardware Manual (MACMS-HW/E).

2.1.4 IOC 8T input / output card

Figure 2-4 shows an IOC 8T input / output card and describes the meaning of the LED. An IOC 8T card has 4 connectors : J1, J2, J3 and J4 and slot error indicator LED on the front panel.

NOTE : For further information refer to the document : VM 600 Series Condition Monitoring System (CMS) Hardware Manual (MACMS-HW/E).

2.1.5 CPU M modular CPU card

Figure 2-5 shows the elements of the CPU M modular CPU card, describes their purpose and gives an enlarged view of the display. A CPU M card consists of the following components :

1- A display and potentiometer to adjust its contrast

2- RS-232 connector

3- Ethernet connector

4- Three status LEDs

5- Diagnostic LED

6- Slot selection buttons

7- Alarm reset button

NOTE : For further information on connecting to a PC, refer to : 1.7 - Connecting to a PC, page 1.17.

NOTE : For further information refer to the document : VM 600 Series Condition Monitoring System (CMS) Hardware Manual (MACMS-HW/E).

2.1.6 IOC N input / output card

Figure 2-6 shows the elements of the IOC N input / output card and describes their purpose. A IOC N card consists of the following connectors :

1- RS connector (type RJ 11)

2- 2 serial communications connectors for Modbus/RTU communication protocol (group A)

3- 2 serial communications connectors for Modbus/RTU communication protocol (group B)

4- 2 Ethernet connectors

5- VGA connector

2.1.7 RLC 16 relay card

Figure 2-7 shows an RLC 16 relay card a) without mating connectors and b) with mating connectors.

NOTE : For further information refer to the document : VM 600 Series Condition Monitoring System (CMS) Hardware Manual (MACMS-HW/E).

The terminals of an RLC 16 relay card may have a hazardous voltage - 230 V(AC) maximum.

Respect the safety installation rules in the VM 600 MPS Hardware Manual (Vibro-Meter Document No. MAMPS-HW/E) when accessing these cards.

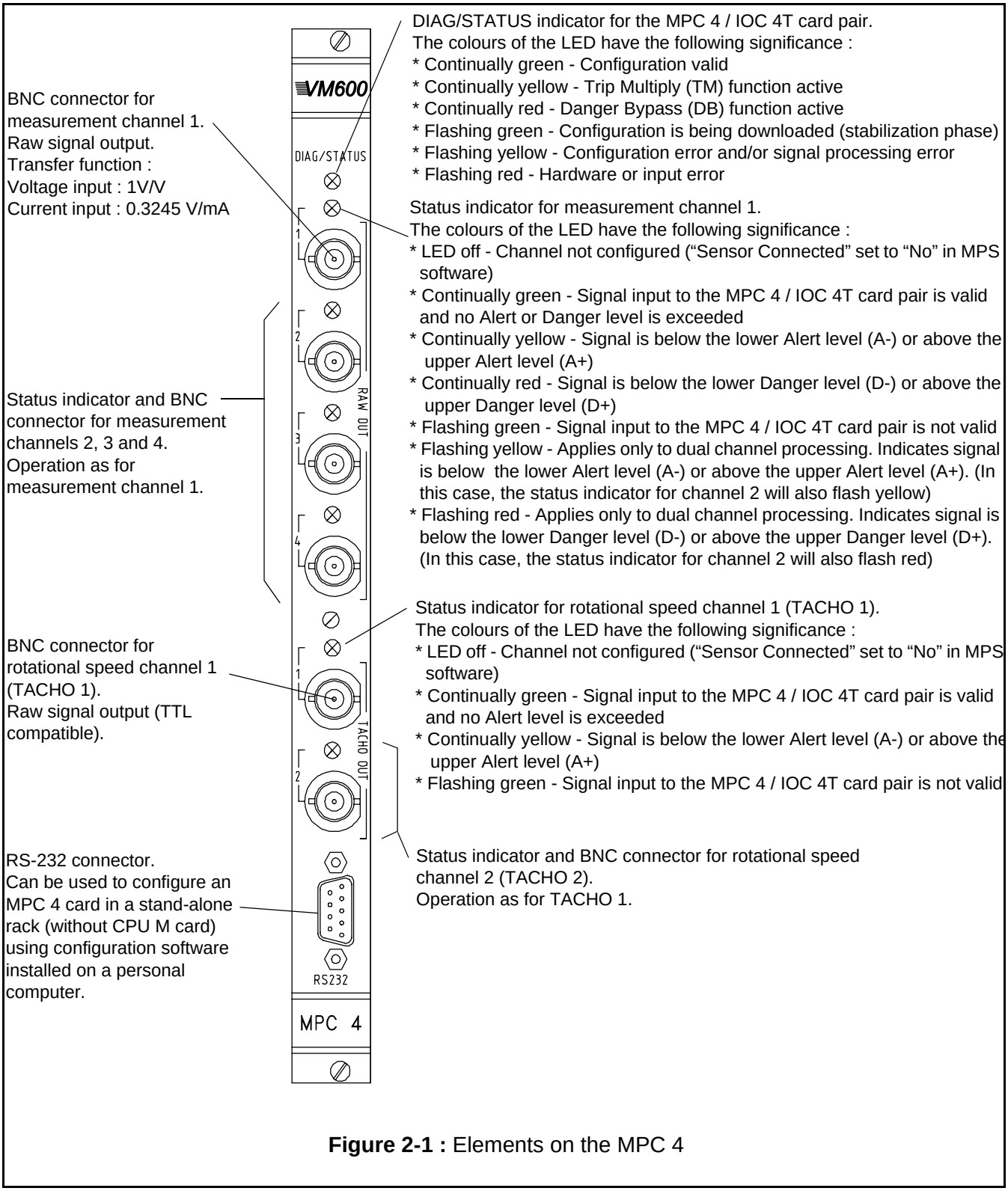


Figure 2-1 : Elements on the MPC 4

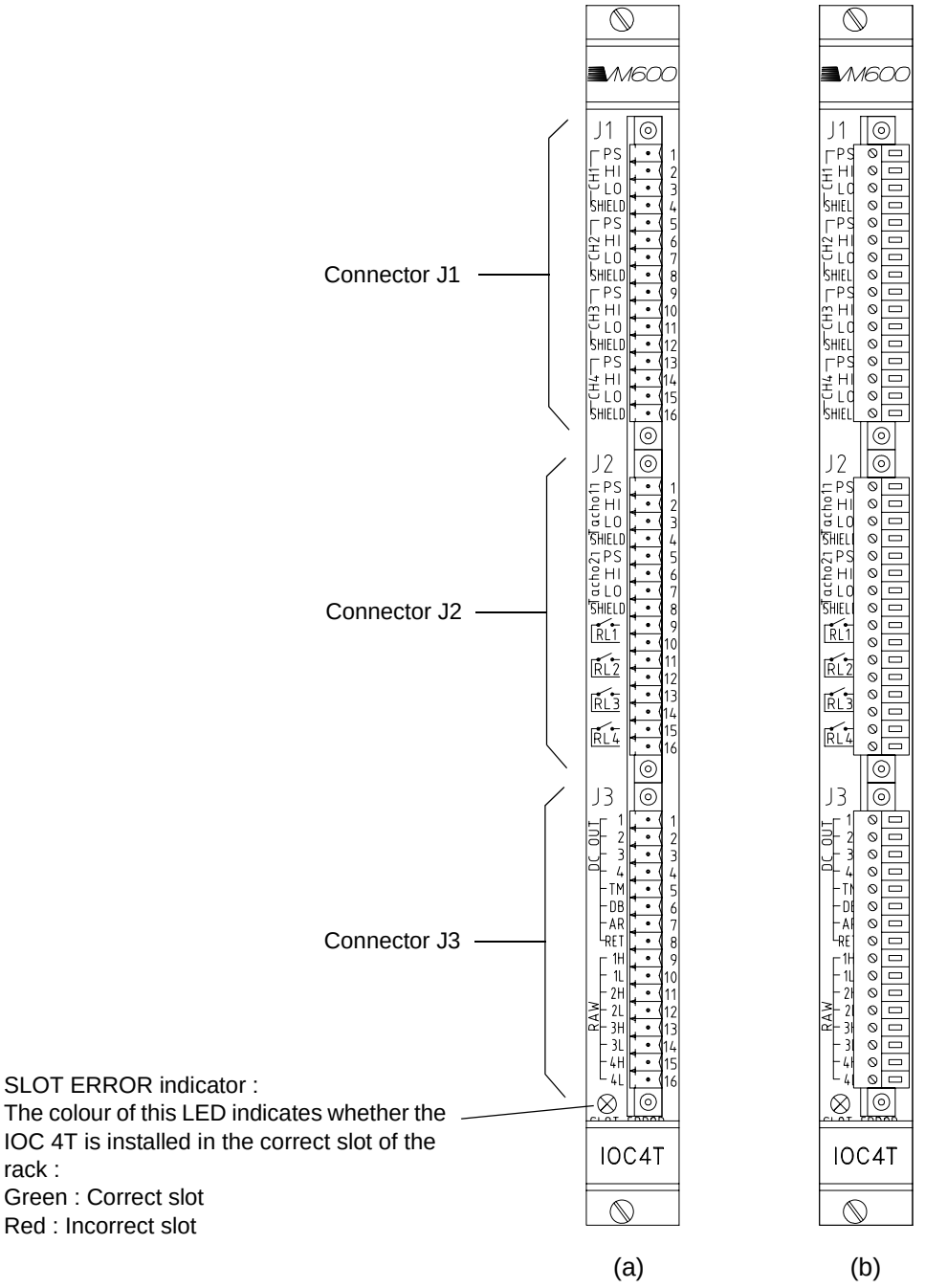
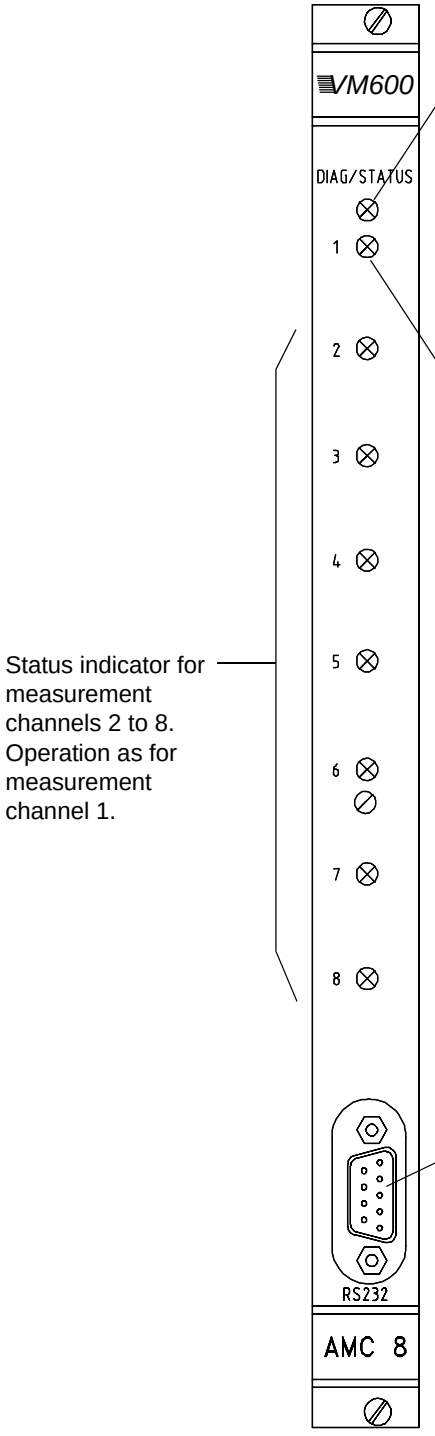


Figure 2-2 : The IOC 4T panel (on rear of the ABE 04X rack)



DIAG/STATUS indicator for the AMC 8 / IOC 8T card pair.
The colours of the LED have the following significance :
* Continually green - Normal operation : No alarms and no errors
* Continually yellow - A “multi-channel” is in Alert condition
* Continually red - A “multi-channel” is in Danger condition
* Flashing green - The AMC 8 card is configured but is still in the stabilization phase
* Flashing yellow - Configuration error or IOC slot mismatch (the slot behind the AMC 8 does not contain the IOC 8T intended for it)
* Flashing red - Hardware error or AMC 8 powered up but not yet configured (monitoring not running)

Status indicator for measurement channel 1.
The colours of the LED have the following significance :
* Off - Single channel is not configured or the AMC 8 is not running
* Continually green - Single channel is configured, signal input to the AMC 8 / IOC 8T card pair is valid and no Alert or Danger level is exceeded
* Continually yellow - Single channel : Signal is below the lower Alert level (A-) or above the upper Alert level (A+)
* Continually red - Single channel : Signal is below the lower Danger level (D-) or above the upper Danger level (D+)
* Flashing green - Single channel : Signal input to the AMC 8 / IOC 8T card pair is not valid (e.g. because of a ruptured line)

Status indicator for measurement channels 2 to 8. Operation as for measurement channel 1.

RS-232 connector
Can be used to configure an AMC 8 card in a stand-alone rack (without CPU M card) using configuration software installed on a personal computer.

Figure 2-3 : Elements on the AMC 8

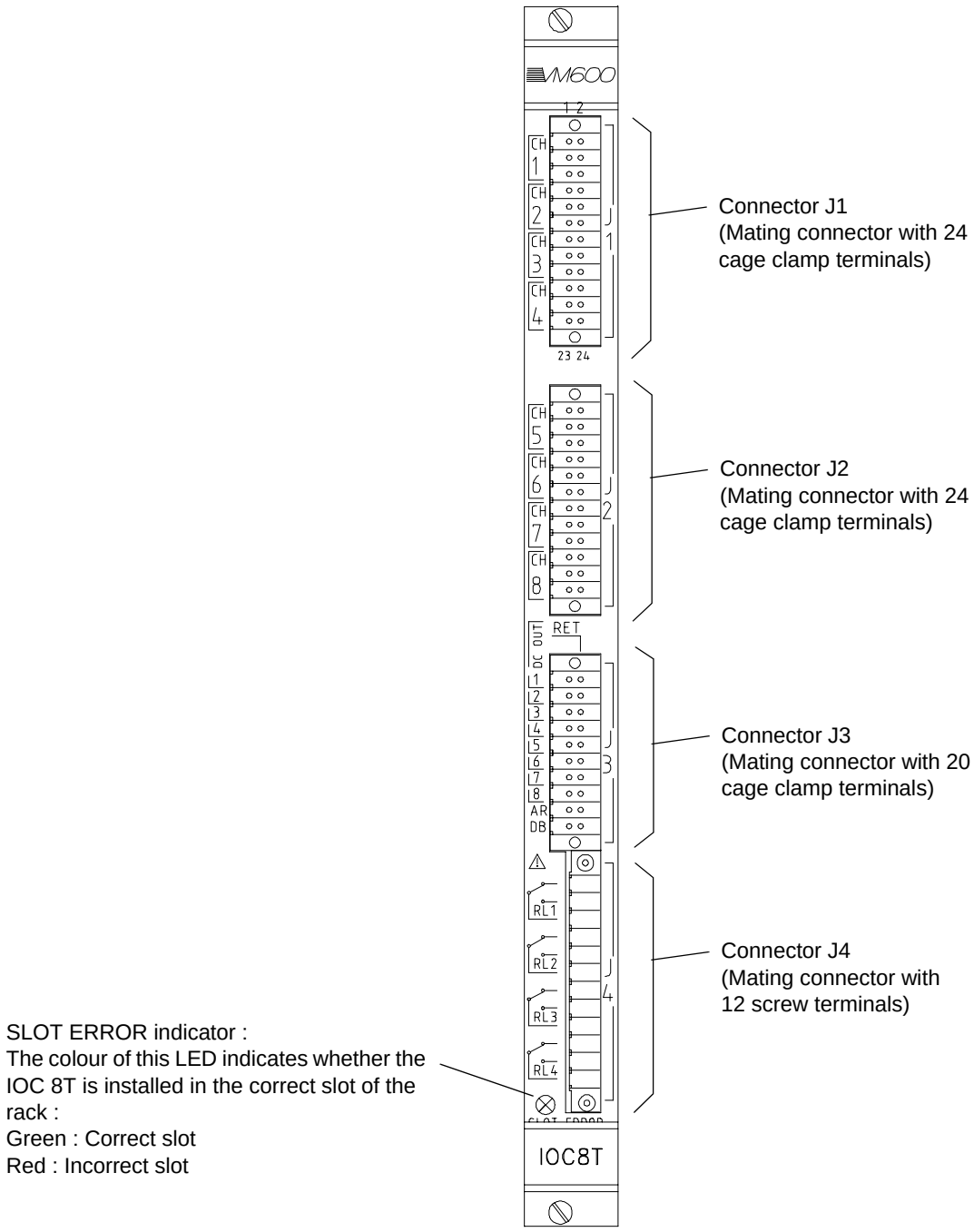


Figure 2-4 : The IOC 8T panel (on rear of the ABE 04X rack)

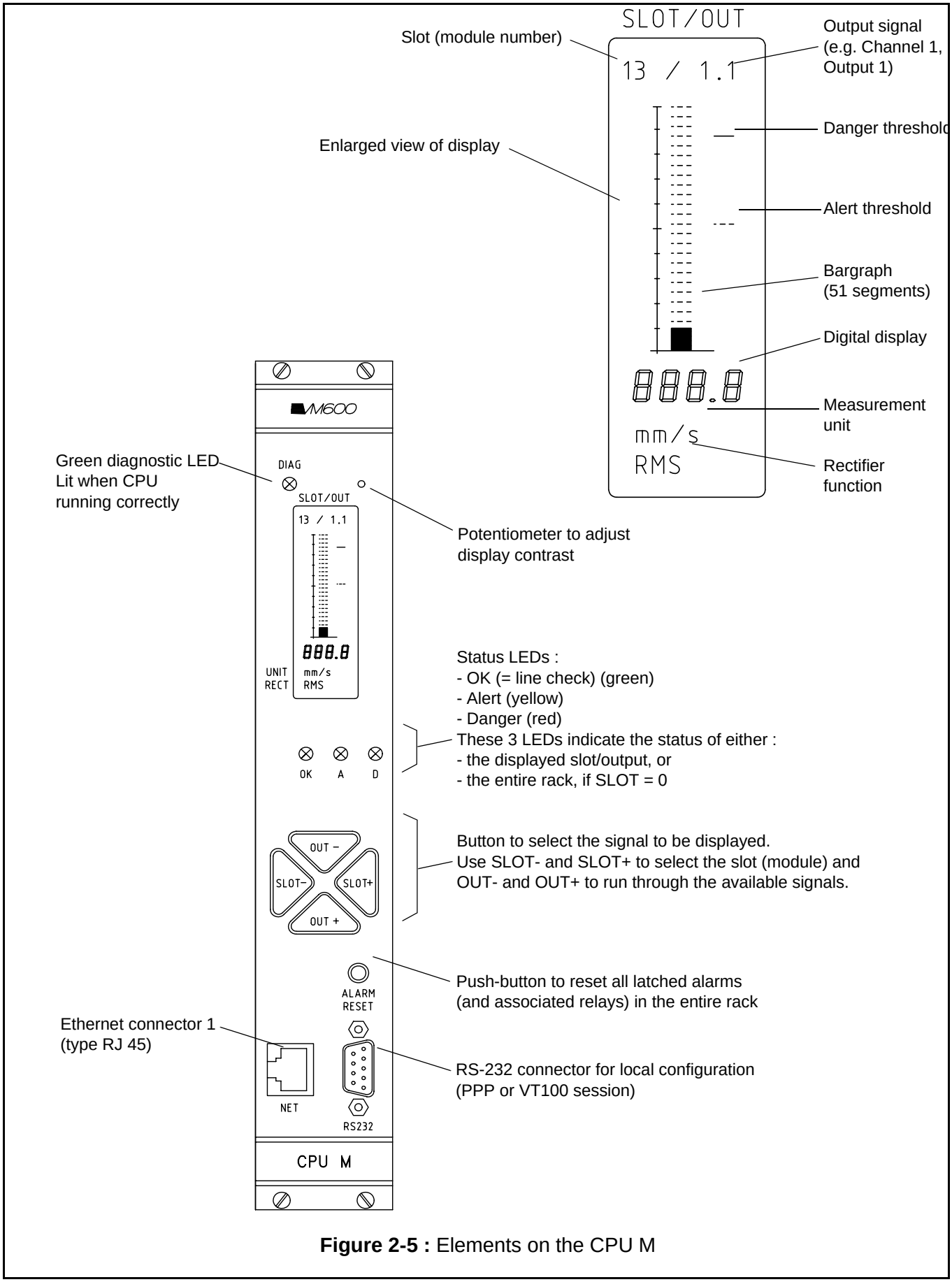
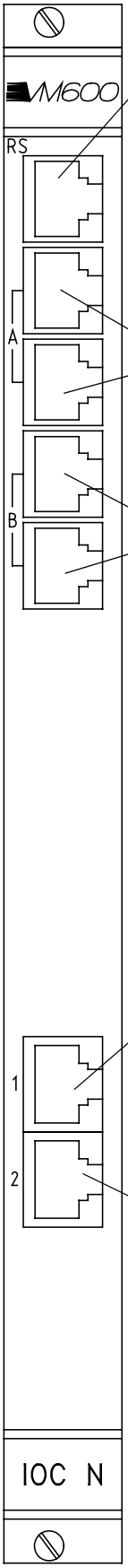


Figure 2-5 : Elements on the CPU M



RS connector (type RJ11) for Modbus/RTU communication protocol
Allows RS-232 or RS-485 communications
(Jumper selectable on CPU M)
No optional PC/104 modules need to be installed

Serial communications connectors for Modbus/RTU communication protocol - Group A
Allows RS-485 or RS-422 communications
Note : If no Serial Communications PC/104 module is installed, jumpers J20 to J24 on the IOC N can be set to link these two connectors to the RS connector described above

Serial communications connectors for Modbus/RTU communication protocol - Group B
Allows RS-485 or RS-422 communications

Note : The optional Serial Communications PC/104 module must be installed to use these connectors. One such module is needed for all 4 connectors.

Ethernet connector # 1 for Modbus/TCP communication protocol and “one shot” configuration
Note: An optional Ethernet PC/104 module must be installed to use this

Ethernet connector # 2 for redundant Modbus/TCP communication protocol
Note: A 2nd optional Ethernet PC/104 module must be installed to use this

Figure 2-6 : Elements on the IOC N

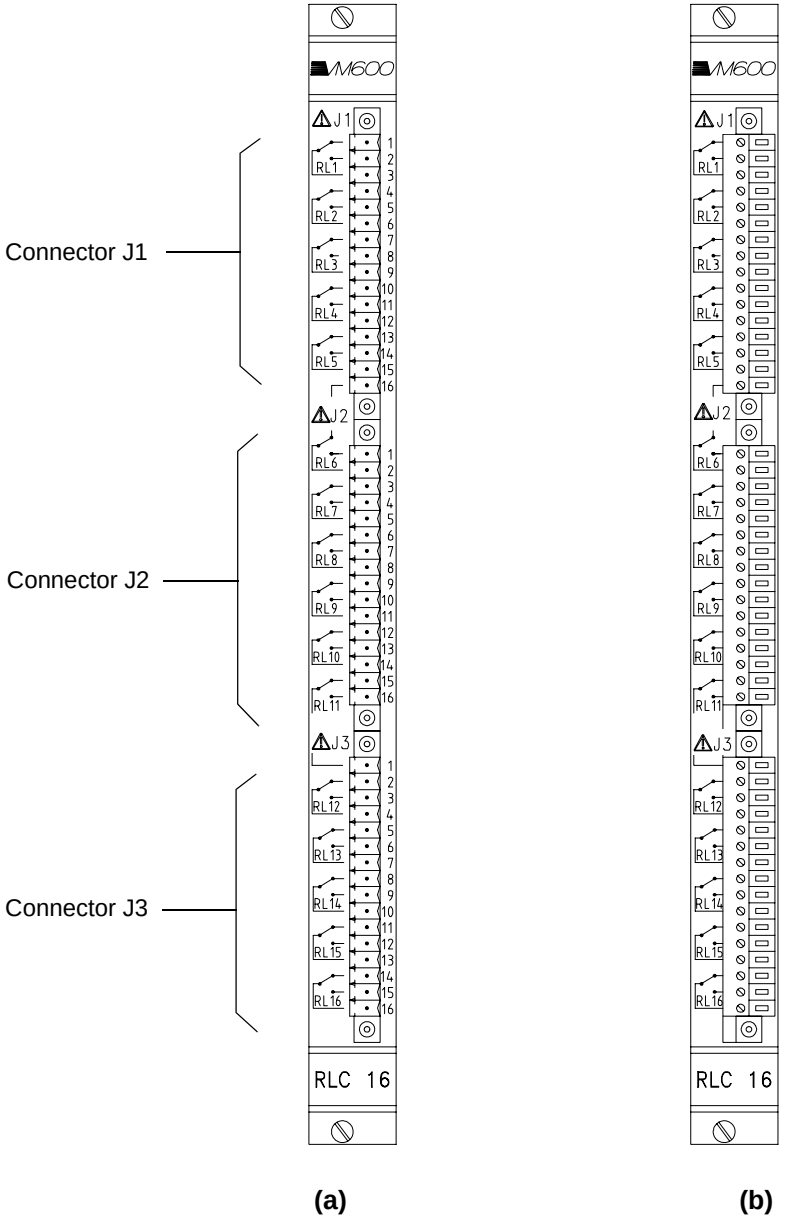


Figure 2-7 : The RLC 16 panel (on rear of the ABE 04X rack)

3 COMMON MAINTENANCE PROCEDURES

This chapter provides a brief overview of common maintenance procedures for MPS hardware. Information is provided regarding replacing and configuring cards.

NOTE : Further information can be found in the VM 600 MPS Hardware Manual (Vibro-Meter Document No. MAMPS-HW/E).

3.1 Replacing cards

When handling cards, the necessary precautions should be taken to prevent damage due to electrostatic discharges.
Refer to Section (near the beginning of the manual) for further information.

Certain precautions must be observed when replacing cards. These are outlined in VM 600 MPS Hardware Manual (Vibro-Meter Document No. MAMPS-HW/E).

3.1.1 Removing cards safely

AMC 8, MPC 4, IOC 4T, IOC 8T and RLC 16 cards all feature a lever mechanism to help the user to easily remove the card. Follow the procedure below (see also Figure 3-1) :

1- Unfasten the two captive fixing screws. These are found at the top and at the bottom of the front panel.

2- With your thumbs, **simultaneously** push the upper handle upwards and the lower handle downwards. These combined actions will cause the card to move forwards by 1-2 mm.

3- Pull on both handles together (with equal force) to extract the card from the rack.

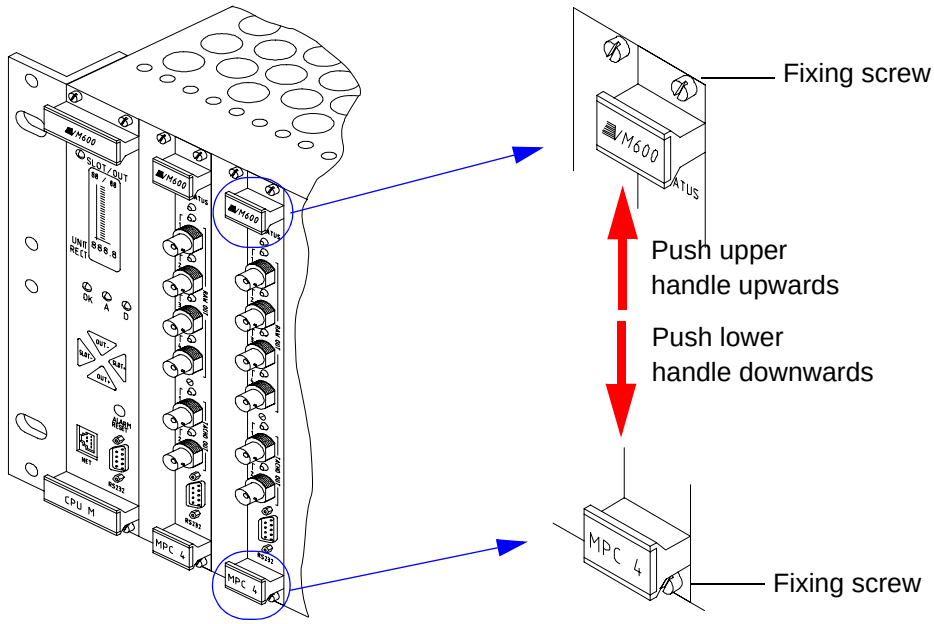


Figure 3-1 : Removing a card from the rack

3.1.2 Hot swapping

It is necessary to power down the ABE 04X rack before inserting or removing any of the following elements :

- CPU M
- RPS 6U - in racks employing a single RPS 6U power supply unit

The following elements have “hot swapping” capability, i.e. they can be removed from / inserted into the MPS rack while it is powered up (a technique sometimes referred to as “live insertion”) :

- AMC 8 - and its matching IOC 8T card
- MPC 4 - and its matching IOC 4T card
- RLC 16
- RPS 6U - a single RPS 6U power supply unit may be replaced in racks employing two such units in racks having 8 or less slots occupied by MPC/IOC pairs (one of the power supplies being “redundant")

NOTE : Further information on hot swapping cards can be found in the VM 600 MPS Hardware Manual (Vibro-Meter Document No. MAMPS-HW/E).

3.1.3 Cards in a stand-alone rack

Hardware damage can occur if a card intended for slot *mm* is inserted in slot *nn*.

Because of this, a new MPC 4 or AMC 8 card must only be installed "live" and without reconfiguration if its configuration is known to be identical to that of the card previously removed.

NOTE : Further information on cards in a stand-alone rack can be found in the VM 600 MPS Hardware Manual (Vibro-Meter Document No. MAMPS-HW/E).

3.1.4 Cards in a networked rack

NOTE : The following remarks concern networked racks. These contain a CPU M card (and, optionally, its matching IOC N card).

In a networked rack, if a card originally used in slot *mm* is inserted in slot *nn*, the CPU M card recognizes that the card’s configuration does not match the slot. It will then download into the new card’s flash memory the appropriate configuration for slot *nn*.

Problems can occur if a card taken from slot *nn* of Rack X is inserted into slot *nn* of Rack Y, as slot *nn* may be used for totally different functions in each rack.

This form of hot swapping should be avoided unless you are certain that the cards in slot *nn* of each rack have exactly the same configuration.

More generally, if you do not know how a card is configured, you should not install it before finding its configuration.

NOTE : Further information on cards in a networked rack can be found in the VM 600 MPS Hardware Manual (Vibro-Meter Document No. MAMPS-HW/E).

3.2 Software configuration

The following procedure can be used to configure MPS software after replacing a card :

1- Disconnect the front-end components (e.g. transducer & conditioner, probe, cables) from the rack by unfastening the connectors on the IOC 4T or IOC 8T card installed in slot *nn*.

2- Insert into slot *nn* the MPC 4 or AMC 8 card whose configuration you want to read.

3- Use the MPS software package to read the configuration of the card in slot *nn* (see example in Figure 3-2, in which the card in slot 3 is selected).

4- Modify the card configuration if necessary using the MPS software.

5- Reconnect the front-end components to the connectors on the IOC 4T or IOC 8T card installed in slot *nn*.

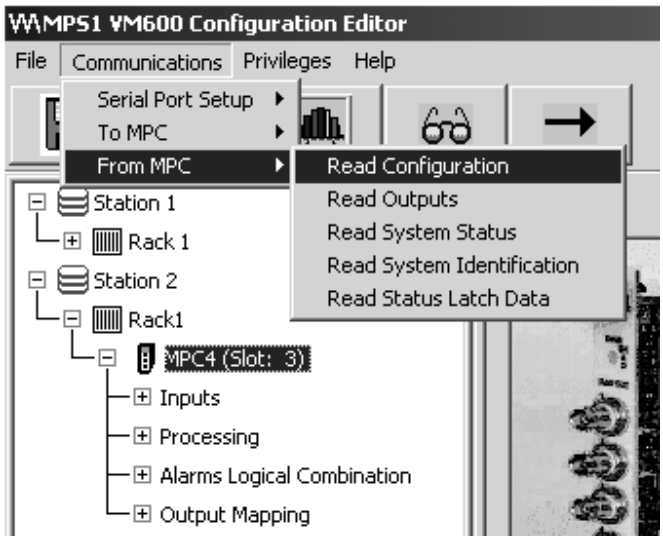


Figure 3-2 : MPS software screen showing how to read the configuration of a card

NOTE : Further information can be found in MPS 1 and MPS2 Configuration Software for Machinery Protection System (Vibro-Meter Document No. MAMPS2-SW/E).

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4 TECHNICAL SUPPORT AND REPAIRS

4.1 Technical support

For technical advice, spare parts, troubleshooting site visits and general enquiries, customers should contact their local I&M Division representative. Your nearest representative can be found on the Vibro-Meter web site :

www.vibro-meter.com

Alternatively, customers can contact :

Vibro-Meter SA
Attn: I&M Customer Support
Route de Moncor 4
P. O. Box
CH-1701 Fribourg
Switzerland

Phone	:	+41 26 407 11 11	(Switchboard)
Fax :		+41 26 407 15 55	(General Customer Support)

E-mail addresses :

support@vibro-meter.com	(General Customer Support)
techsupport.ch@vibro-meter.com	(Technical Support)
techpubs.ch@vibro-meter.com	(Technical Documentation)

4.2 Repairs

For warranty repairs and replacements, customers should contact their local I&M Division representative. Your nearest representative can be found on the Vibro-Meter web site :

www.vibro-meter.com

Alternatively, customers can contact :

Vibro-Meter SA
Attn: Repairs Department
Route de Moncor 4
P. O. Box
CH-1701 Fribourg
Switzerland

Phone	:	+41 26 407 13 43	(Direct)
Fax :		+41 26 407 17 05	(Direct)
E-mail :		repairs.ch@vibro-meter.com	

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Company _____ Email _____

Address _____

Country _____ Post code _____

Telephone _____ Fax _____

Signature _____ Date _____

Product details: Plug-in modules display Product Detail information on a sticker pasted on the unit.

Module type: _____

Serial number (S/N): _____ Part number (P/N): _____

Vibro-Meter order number: _____

Date of purchase: _____ Site where used: _____

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☐ Always evident ? ☐ Intermittent ? ☐ Temperature dependent?

Please use this space for any additional information: ¨

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