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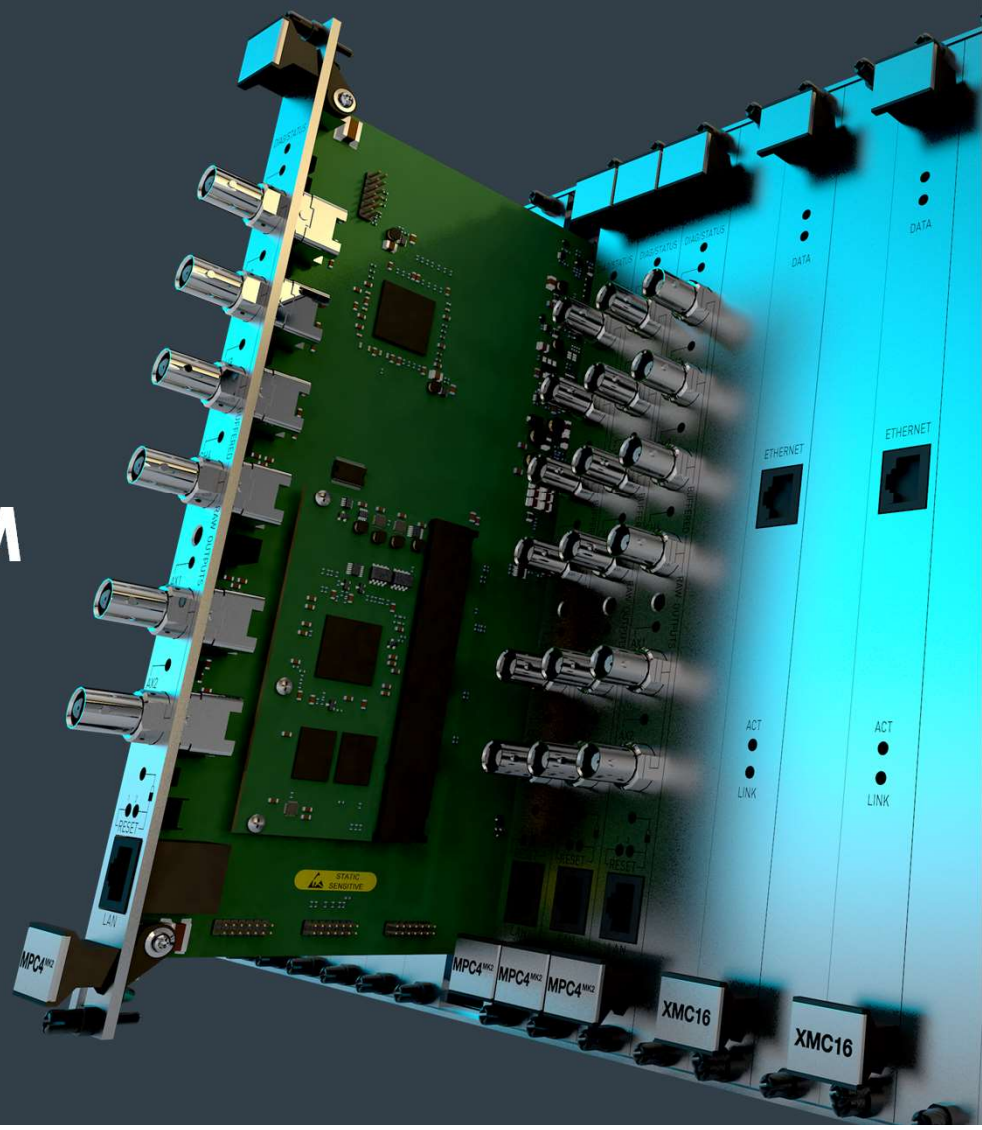
To Fly To Power To Live

vibro-meter

VM600MK2
MACHINERY PROTECTION SYSTEM



VM600Mk2 in comparison to VM600Mk1

Presented by Krzysztof Solinski
Sr. Applications Engineer

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VM600 Mk2 in comparison to VM600Mk1

OVERVIEW

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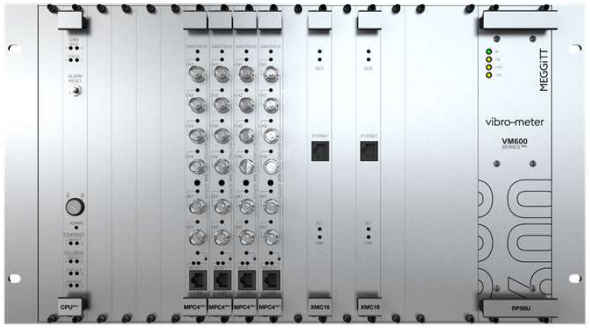
Next generation protection system

VM600^{MK2} – Main components

CPUM^{Mk2}
(+ IOCN^{Mk2})



VM600^{Mk2}

MPC4^{Mk2}
(+ IOC4^{Mk2})

RLC16^{Mk2}

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MPC4^{MK2} + IOC4^{MK2}

Overview of differences between MPC4^{Mk1} and MPC4^{Mk2}

Feature	MPC4^{Mk2}	MPC4^{Mk1}
[MPC4] ADC input resolution	24 bit	12 bit
[MPC4] Sensor OK delay	User configurable	10 s (fixed)
[MPC4] Frequency signal analysis	Yes (Band RMS, Band Peak, Residual signal)	No
[MPC4] Waveforms and spectra for troubleshooting (VibroSight Vision)	Yes	No
Extended logical function	32 Advanced	8 Basic and 4 Advanced
[MPC4] Hot swapping feature	Yes (configuration stored on the IOC4^{Mk2})	Yes (but only with the CPUM)
Auxiliary inputs can be used for tacho signals as well as quasi-static signal processing	Yes	No
MPC4 status relay (common-circuit fault)	Yes	No
Monitoring of RLC16^{Mk2} module status	Yes (RLC16^{Mk2})	No
Relay arrangement	5 relays, all contacts available, jumperless configuration	4 relays, only NO or NC available, jumper-based configuration

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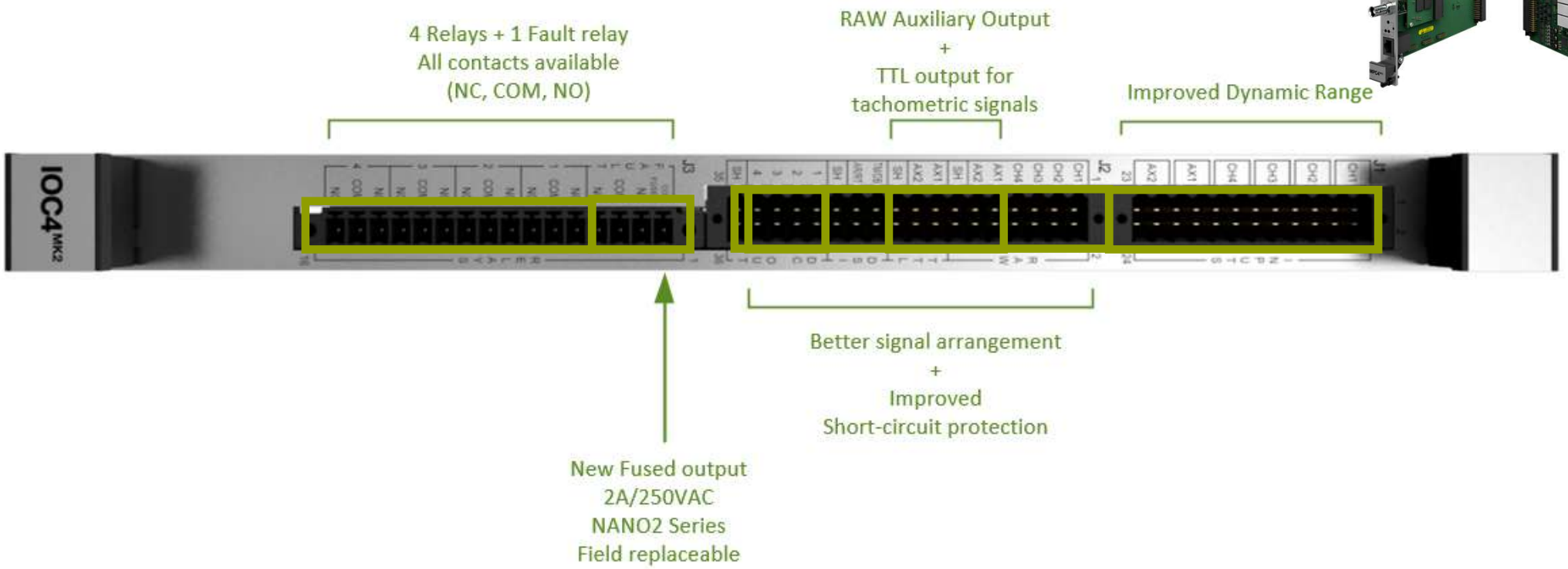
MPC4MK2 + IOC4MK2

IOC4Mk2 connectors



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RLC16^{MK2}

Overview of differences between RLC16^{Mk1} and RLC16^{Mk2}

Feature	RLC16^{Mk2}	RLC16^{Mk1}
Machinery protection relays	16	16
Epoxy sealed relays with all contacts available	Yes	No
NO/NC contacts and normally energized (NE) or normally de-energized (NDE) configuration without jumpers	Yes	No
Raw bus output line to communicate the RLC16 status	Yes	No
Raw bus input line to de-energize all NE relays (known as the Redline signal)	Yes	No

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RLC16^{MK2}

Overview of differences between RLC16^{Mk1} and RLC16^{Mk2}

RLC16^{Mk1} connectors are 1 to 1 compatible with RLC16^{Mk2}

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VM600 Mk2 in comparison to VM600Mk1

VM600MK2 advantages

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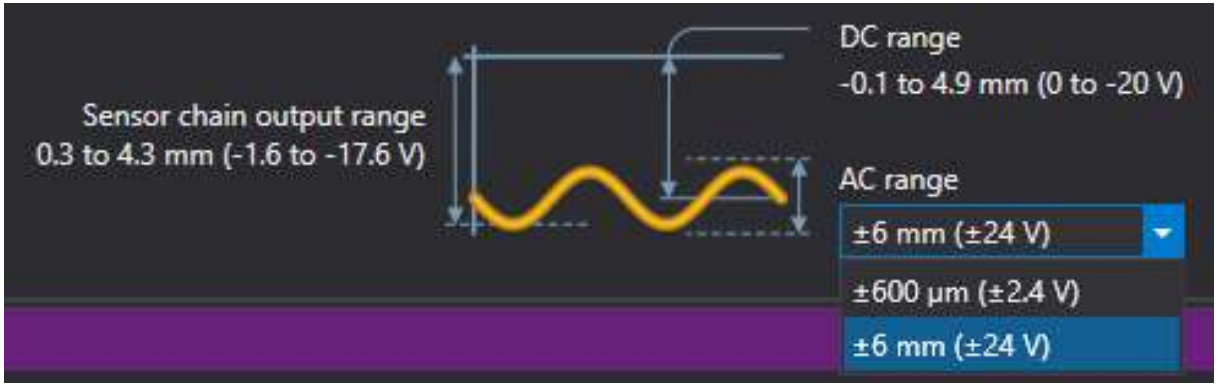
MPC4^{MK2} + IOC4^{MK2}

Analog input range and resolution

Higher resolution and dynamic range (>80 dB)

- New analog front-end.
- 24 bit analog-to digital converter (ADC) ensures significantly better amplitude resolution.
- Two selectable input ranges input ranges for better input dynamic range depending application.



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MPC4^{MK2} + IOC4^{MK2}

Sensors OK delay

The time (delay) which the sensor / measurement chain has to remain within the Sensor OK check limits can now be:

- Set to any arbitrarily chosen value.
- Set individually for each measurement chain.

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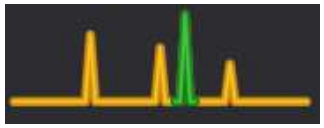
MPC4^{MK2} + IOC4^{MK2}

Fixed Frequency and order tracking analysis

Dynamic signals can be processed in both time and frequency domains. Multiple signal extractions are available:

- 1X, 2X, 3X, …



(Vector)

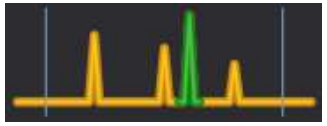
- Not 1X

(Scalar)

- Band RMS

(Scalar)

- Band Peak



(Phasor)

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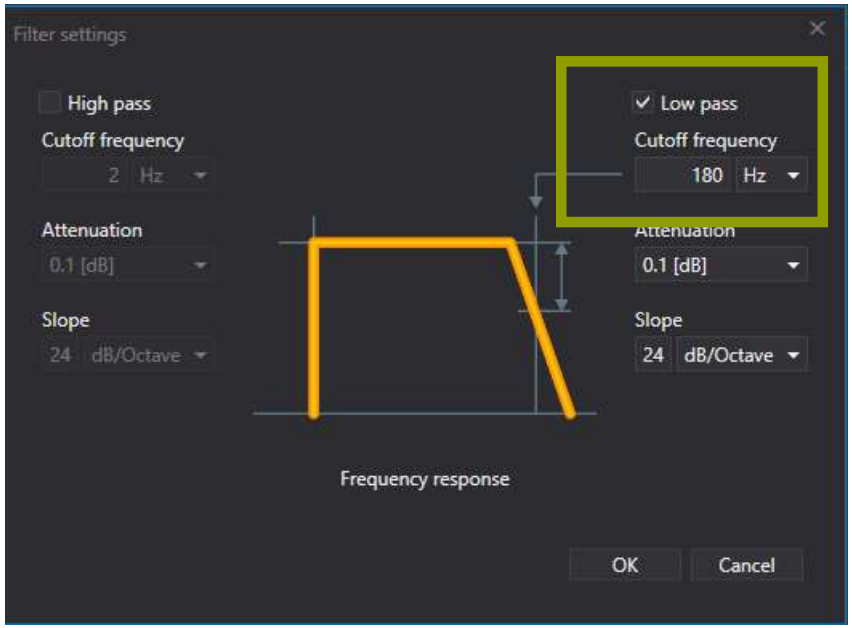
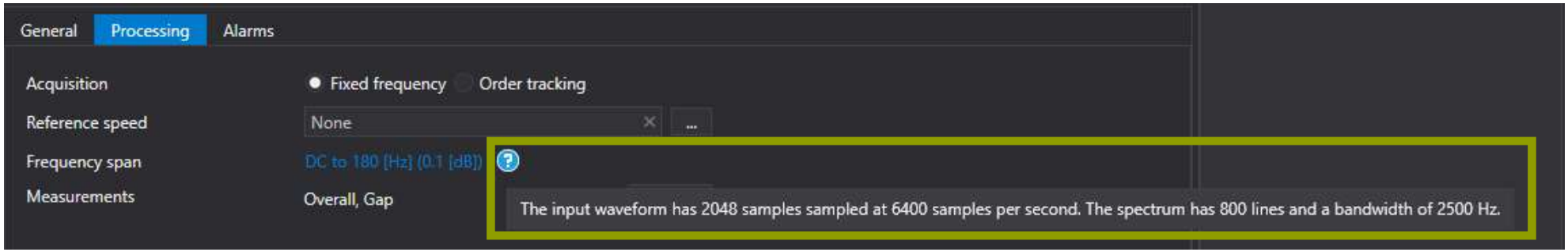
MPC4^{MK2} + IOC4^{MK2}

Fixed-frequency signal analysis

Fixed-frequency signal analysis allows examine the signal in both time and frequency domain:

- 800 lines spectra (corresponding to 2048 sample waveforms).
- Hanning (Hann) window.
- High frequency limit of the spectrum depends on the filter setup
  - High frequency spectrum limit is always several times higher than the **Cutoff frequency** of the **Low pass** filter.





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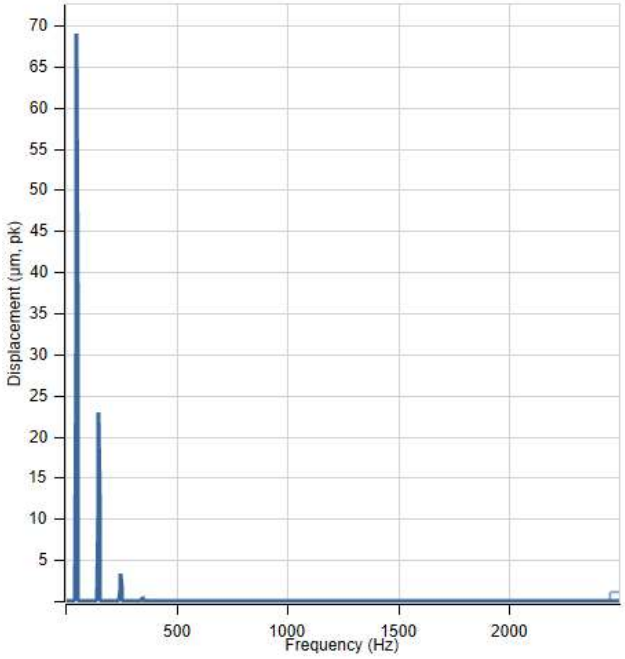
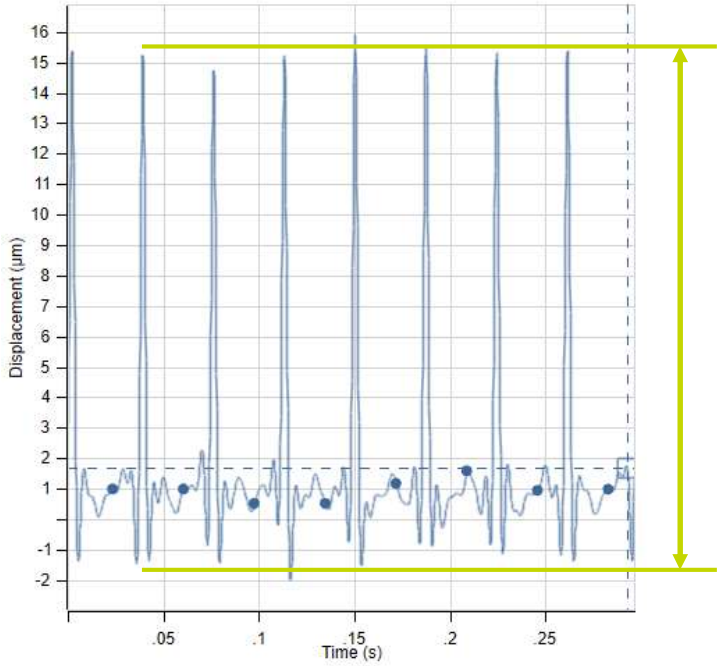
MPC4^{MK2} + IOC4^{MK2}

Properties of fixed-frequency spectra

Fixed-frequency signal processing allows user to extract not only the frequency domain signal extraction but also time domain extractions, which are calculated basing on signal waveforms which are oversampled for better precision





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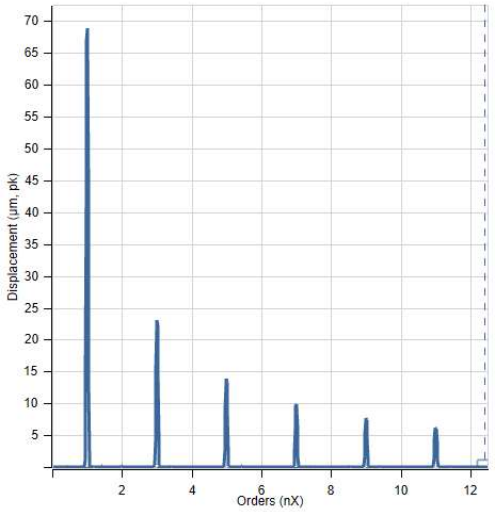
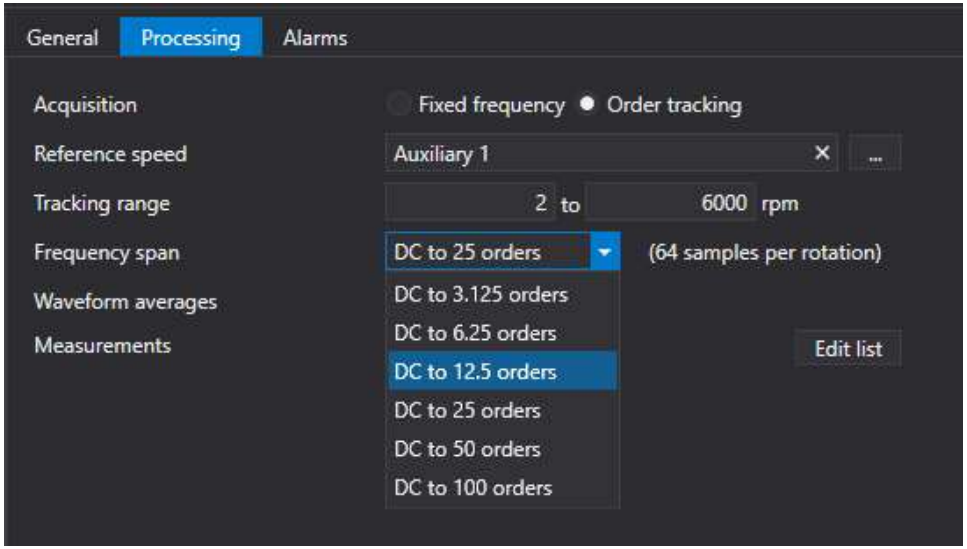
MPC4^{MK2} + IOC4^{MK2}

Order tracking

Order-tracked spectra:

- Flat-top window.
- High order spectrum limit is setup by the user
  - VibroSight Protect informs the user about the number of samples per revolution.
  - Only frequency domain extractions are available





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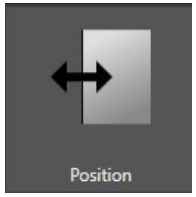
MPC4^{MK2} + IOC4^{MK2}

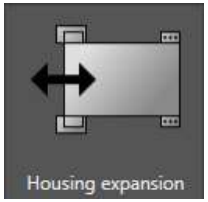
Auxiliary channels

In MPC4^{Mk2} features 2 Auxiliary inputs / channels which can be used for measurement of:

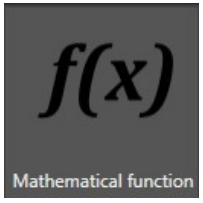
- Rotation speed (Tacho)

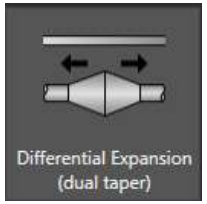
- Quasi static signals

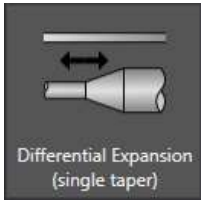


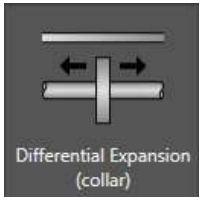


- Dual processing









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MPC4^{MK2} + IOC4^{MK2}

Logical functions

MPC4^{Mk2} provides advanced logical functions that are much easier and straight forward to configure as they are based on logical gates:

- 32 logical functions per module.
- 32 inputs per logical function.
- Logical inputs can be inverted.

Inverted input

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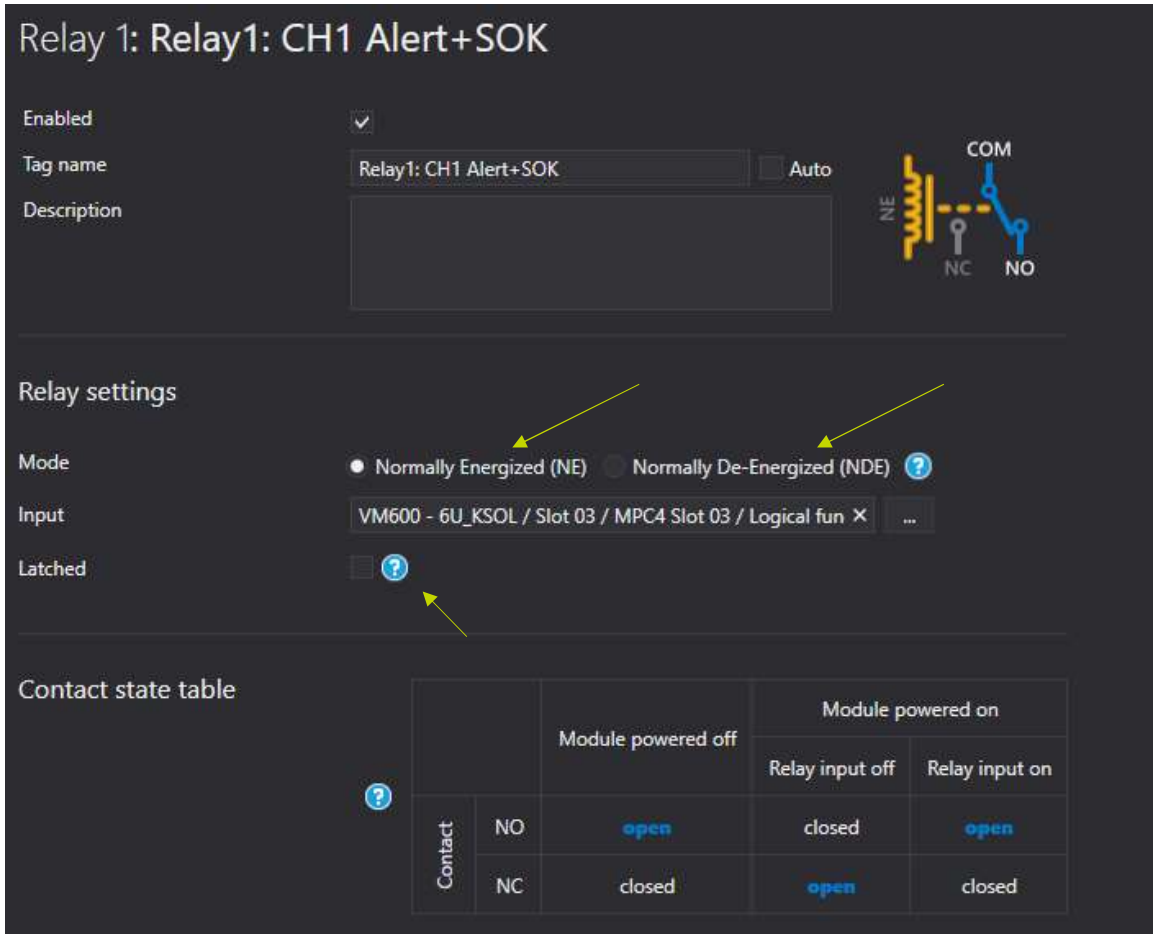
MPC4^{MK2} + IOC4^{MK2} and RLC16^{MK2}

Relays

MPC4^{Mk2} (+ IOC4^{Mk2}) provides new relay functionality:

- Jumperless configuration of **Normally Energized (NE)** and **Normally De-Energised (NDE)**.
- **Relay** position can be **Latched** even if it is associated with a not latched alarm.



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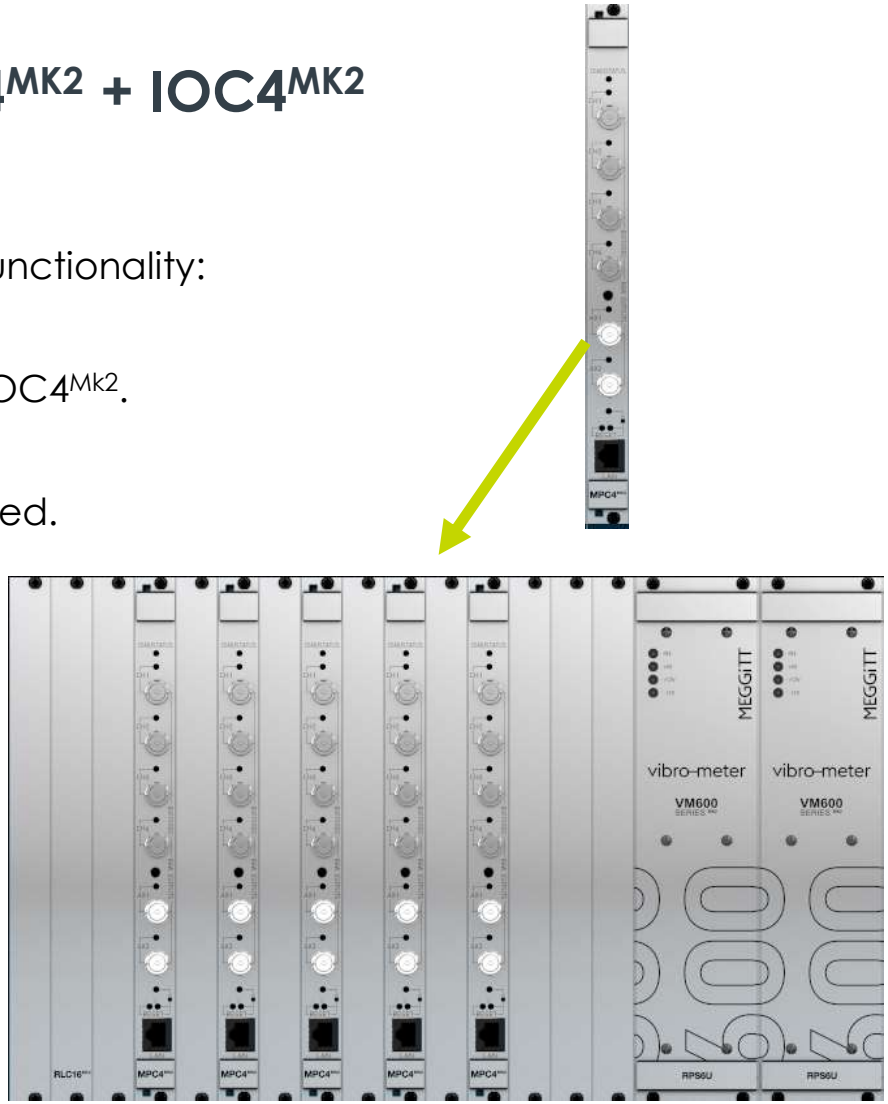
New module: MPC4^{MK2} + IOC4^{MK2}

Hot swap

MPC4^{Mk2} features hot swap functionality:

- Configuration is stored on IOC4^{Mk2}.
- CPUM^{Mk2} module not required.



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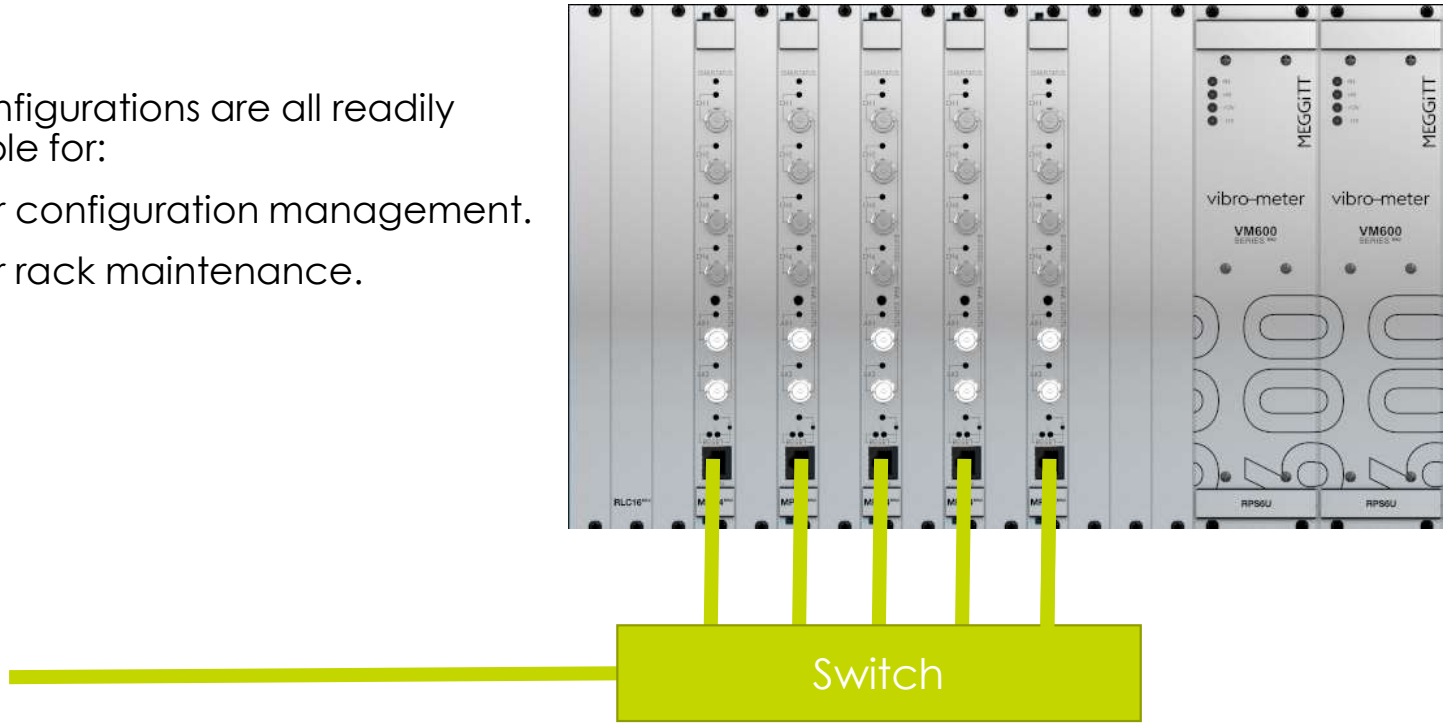
New module: MPC4^{MK2} + IOC4^{MK2}

Easier Maintenance

Each MPC4^{Mk2} stores the configurations for itself and all other MPC4^{Mk2} module in the rack.

The configurations are all readily available for:

- Easier configuration management.
- Easier rack maintenance.



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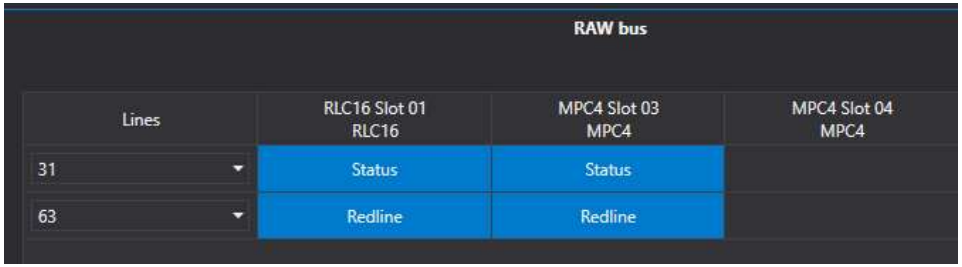
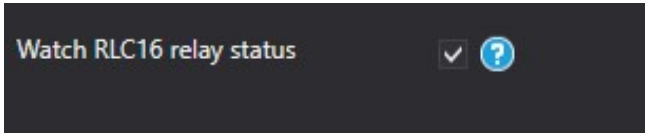
RLC16^{MK2}

Features

- For higher reliability, RLC16^{Mk2} has fewer jumpers than its predecessor (MPC4^{Mk2} determines if the relay is NDE or NE).

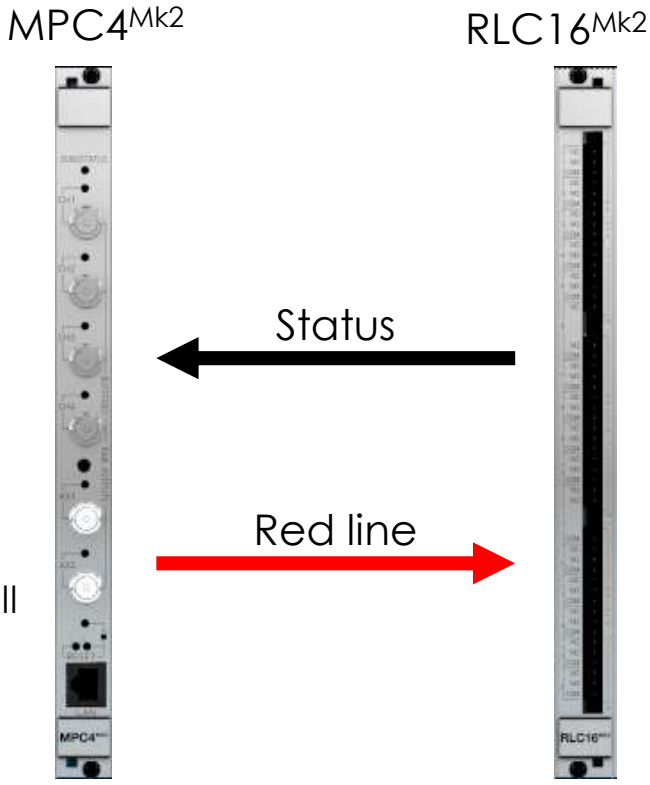


- RLC16^{Mk2} has an internal check that confirms the energization status of each relay, compared to the commands sent by MPC4^{Mk2}.



- RLC16^{Mk2} communicates its status to MPC4^{Mk2} using a module **Status** signal (Raw bus line). In case of a fault, MPC4^{Mk2} will go to the fail-safe state and use the **Redline** signal to de-energise all NE relays on RLC16^{Mk2}.

One MPC4^{Mk2} can monitor one RLC16^{Mk2}.



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VM600 Mk2 in comparison to VM600Mk1

COMPATIBILITY

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MPC4^{MK2} + IOC4^{MK2} and RLC16^{Mk2}

Compatibility

- VM600^{Mk2} can replace VM600^{Mk1} hardware providing the same functionality extended with new benefits and features.
- Racks configured at Meggitt SA will feature VM600^{Mk2} or VM600^{Mk1} modules.
- It is possible to have VM600^{Mk2} and VM600^{Mk1} modules in the same rack
  - In cases in which the Raw bus is not used.
  - In case in which the Raw bus lines are used, it has to be guarantied that there are no conflicts in Raw bus signal routing, so some system checks are required!

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MPC4^{MK2} + IOC4^{MK2} and RLC16^{Mk2}

Compatibility with VM600 Mk1 hardware

- MPC4^{Mk2} can send logic signals to RLC16^{Mk1}:
  - Bus lines must be configured in accordance with the hardware manual and necessary checks have to be carried out in order to ensure proper functionality.
  - The MPC4^{Mk2} module's "**Watch RLC16 Status**" option has to be **disabled** (VibroSight Protect).

- MPC4^{Mk1} can work with RLC16^{Mk2} but following limitations have to be taken into account:
  - Bus lines must be configured in accordance with the hardware manual and necessary checks have to be carried out in order to ensure proper functionality.
  - Relays must be configured as **Normally De-Energized (NDE)** only.

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VM600^{Mk2} technical information

- **VM600^{Mk2} dedicated webpage** -> https://meggittsensing.com/energy/vm600mk2/
- Articles on **Machinery Protection System** -> https://meggittsensing.com/category/machinery-protection/

Questions and support:

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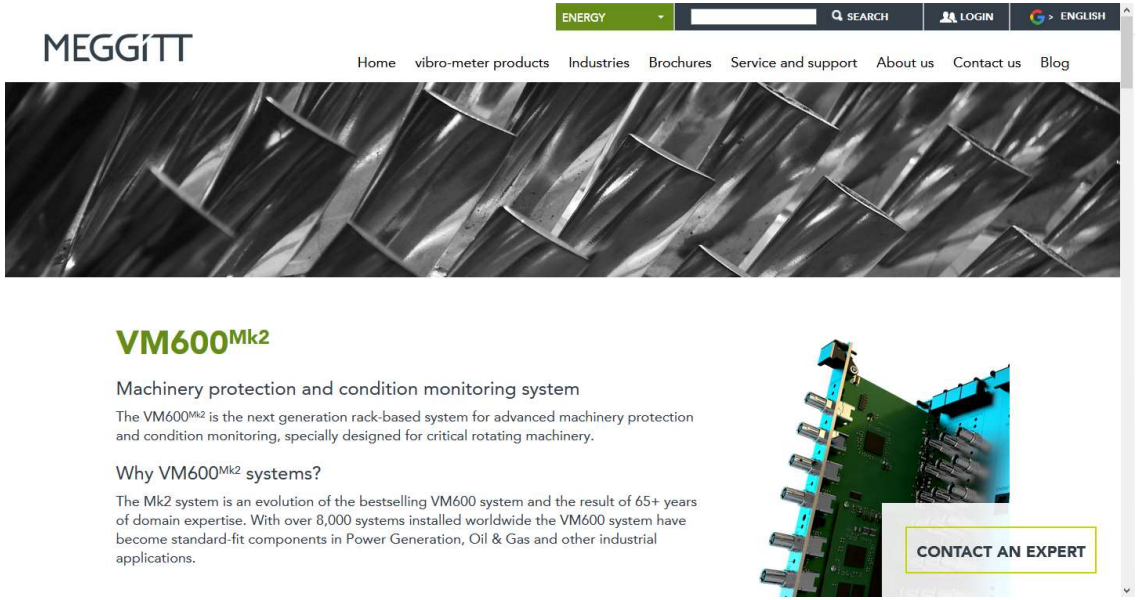

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VM600 Mk2 in comparison to VM600Mk1

Q&A

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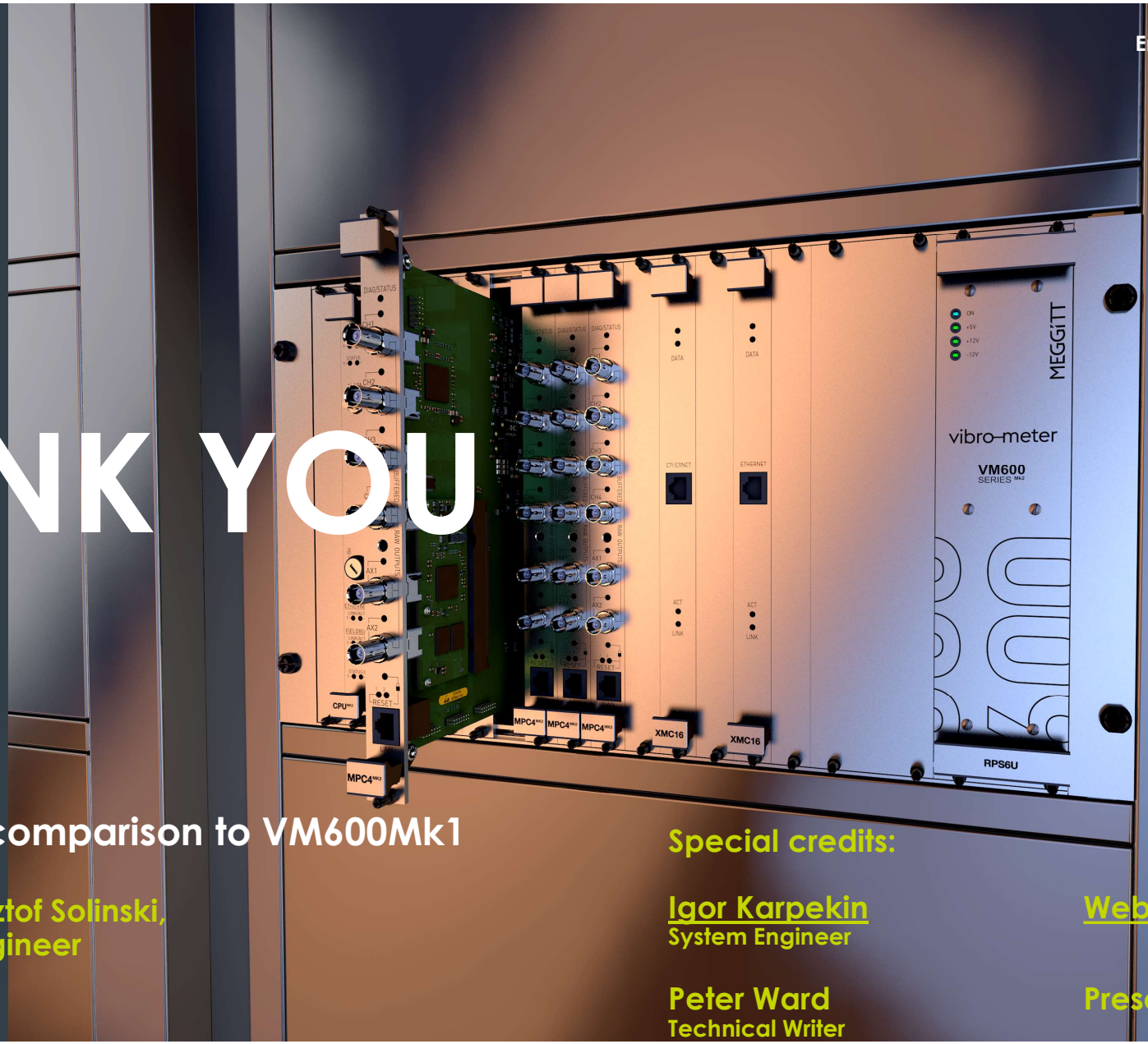

THANK YOU

VM600 Mk2 in comparison to VM600Mk1

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Presentation check

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