kolibrik

Cell Voltage Monitor

24-channel cell voltage monitor module and sets for H2 fuel-cell stacks

CVM–24P series

Product Description

A cell voltage monitoring (CVM) system tailored for research, testing and practical application of H2 fuel cells. The CVM system protects the integrity of individual cells and provides valuable data for predictive maintenance planning and performance optimization.

Adapted for research and testing purposes, the **CVM-24P** system offers excellent accuracy and is designed primarily for electrolyzers.

These ready-to-use cell voltage monitor sets are easily integrated into specialized applications and allow direct connection to a PC via **USB** or to a PLC via **RS-485** or **CAN** bus.

Explore our precision 2.5 V solutions with the **CVM-64H** module and sets, or opt for the cost-effective **CVM-32A** module and sets. For broader temperature and voltage monitoring requirements, consider our **TEVOMET** solutions.

**Contact our sales team at sales@kolibrik.net for customized CVMs to meet your specific requirement.**

Technical Parameters

Channel count	24 channels per one CVM-24P module
Channel voltage range	± 5 V
Input impedance	≥ 1 MΩ
Isolation	1 kV between channels and power supply + communication bus Additional isolation can be provided by isolating bus segments
Sampling	Precise 24-bit ADCs, all-channel sample rate up to 250 sps
Accuracy	0.02% of range + 0.05% of reading
Cell connection	26-pin IDC connector (automotive-grade connectors on request)
Communication bus	RS-485: XC2 / Modbus RTU CAN bus Compatible with other Kolibrik modules
Inputs / outputs	Opto-isolated I/O with serial communication capability
Power supply	7 ... 33 V DC / 2.2 W max
Application examples	H2 fuel-cell tests stands H2 fuel-cell application monitoring Electrolyzers monitoring Control systems

Dimensions	CVM-24P module without enclosure CVM-S24P … CVM-S480P CVM-E24P	85 x 58 x 13.5 mm 90 x 61 x (n*) x 16 + 24) mm 90 x 61 x 16 mm *) n - number of 24-channel modules
Mounting	DIN-rail and wall-mount holders for set enclosures Single module without enclosure: 4x mounting hole 2.7 mm, hex spacers with M2.5 thread	
Channel count examples	Single CVM-24P module CVM-S24P CVM-S48P CVM-S120P CVM-E24P	24 channels 24 channels 48 channels 120 channels additional 24 channels
	Multiple modules can be daisy-chained to measure up to 480 channels, custom sets for more channels available	
Ambient operating temperature	-40 °C to +85 °C +85 °C to +125 °C module can be powered, measurement inactive	

*) Channels are organized by groups of 4 channels. Channels in one group can measure up to ±20 V if the sum of group channels does not exceed 20 V. So, one channel can measure up to ±20 V, if other channels in group are short-circuited. Note that adjacent channels and groups are chained together and are not independent.
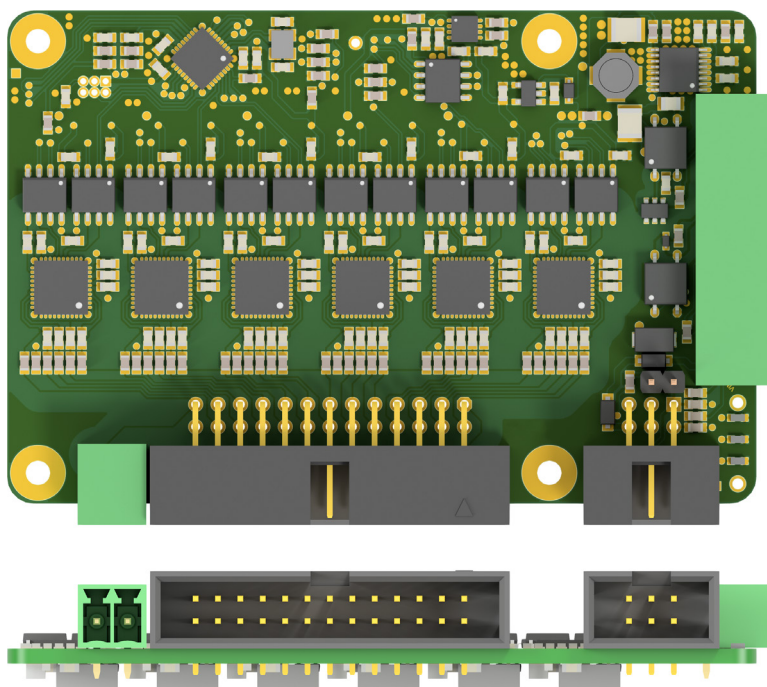

CVM-24P module

System Modularity

Cell voltage monitoring system set

- One power and communication module KMS-PWR
- Number of 24-channel modules CVM-24P, depending on number of channels needed
- Up to 480 channels with step of 24

For high amount of modules, power supply distribution and isolation voltage must be considered. Maximum recommended length for those sets is 20 modules. For more channels, more sets can be chained.
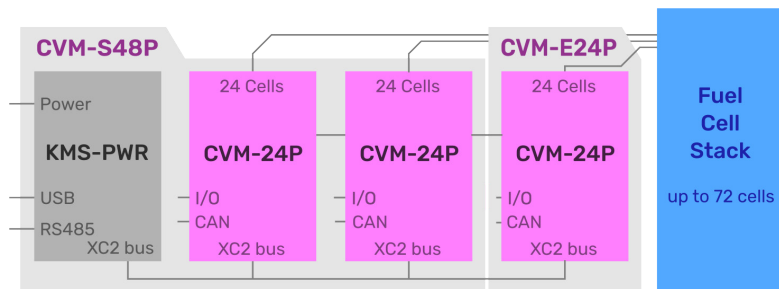
Contact our sales team at sales@kolibrik.net for customized solutions.
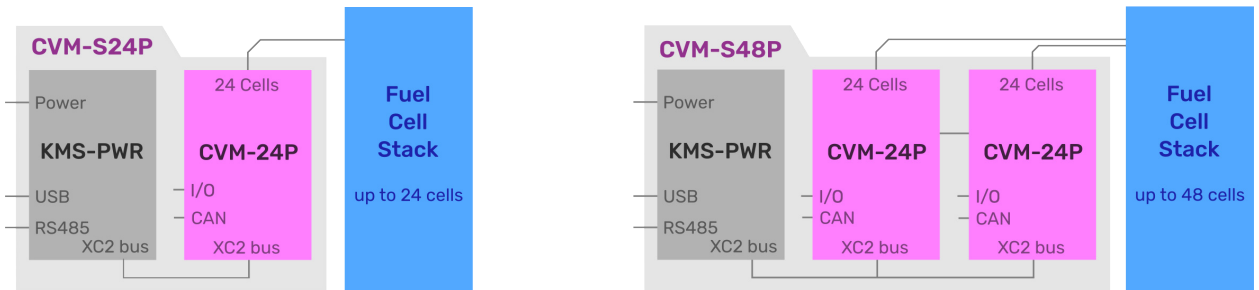
Block scheme of modules in 24-channel **CVM-S24P**

Block scheme of modules in 48-channel **CVM-S48P**
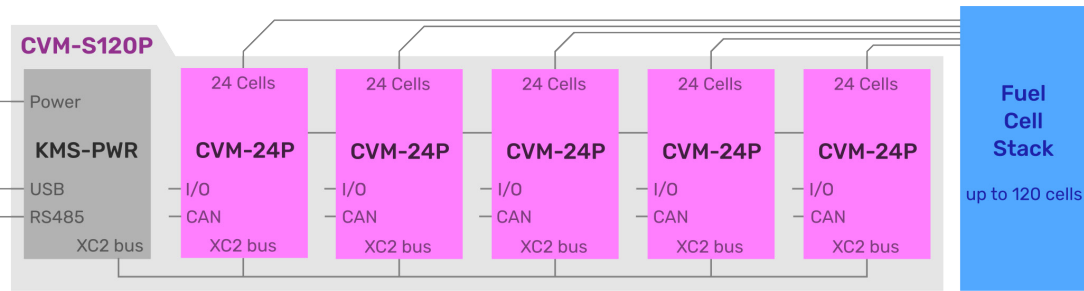
Block scheme of modules in 120-channel **CVM-S120P**

Example of 72-channel monitoring system made by extending **CVM-S48P**
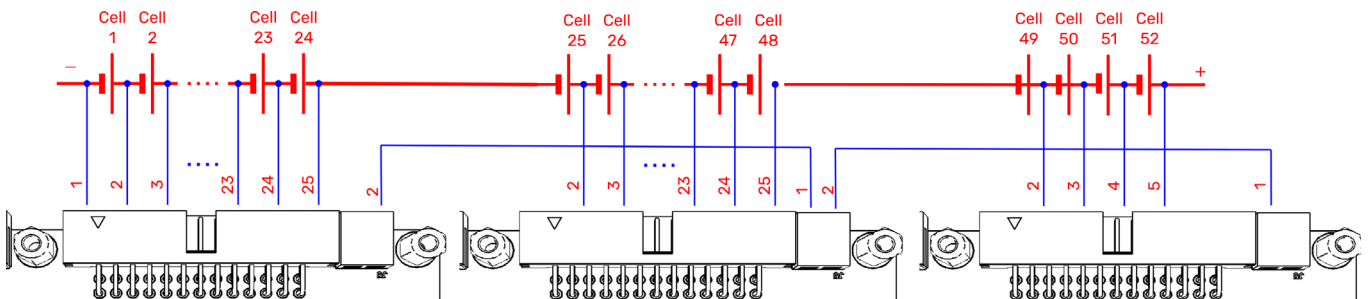by an extension **CVM-E24P**

Cell Connection
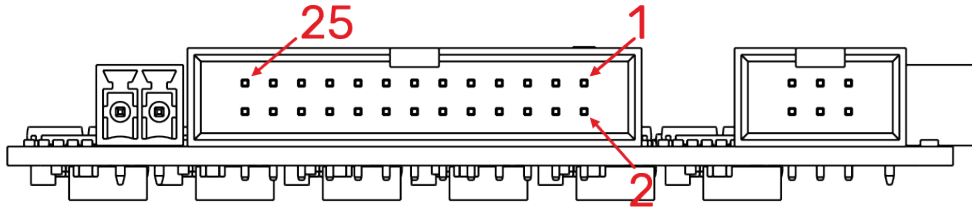
Pinout description of **CVM-24P** channel
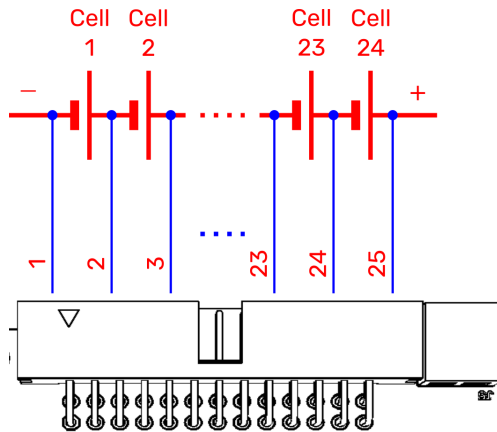
CVM-24P connection of 24 cells

Example of 52-channel connection with chaining
**3 CVM-24P modules** (2x24 + 1x4 cells)

Integration Options

This section outlines various methods for integrating and utilizing the functionalities of Kolibrik.net CVM system. Each method is supported by relevant visual aids to enhance understanding and ease of application.

- **Integration via CVM Manager**

  Automated Application CVM Manager facilitates real-time monitoring and configuration through its sophisticated interface, which allows users to log data seamlessly and visualize it through dynamic charts.
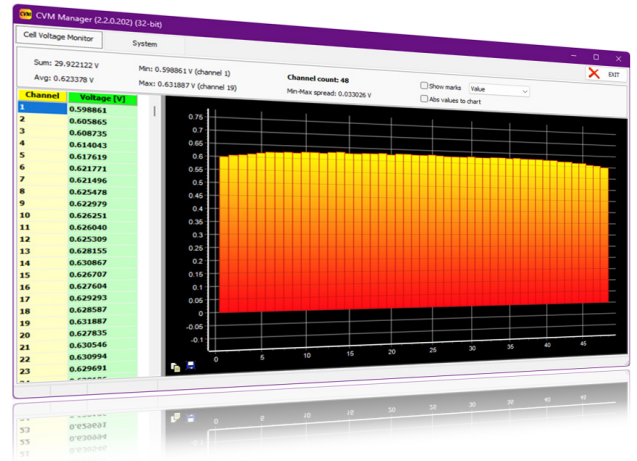
- **REST API Server Access via CVM Manager**

  CVM Manager also supports a REST API server, readily accessible within the local network. This server allows the execution of standardized HTTP requests, simplifying the process of data retrieval and control.

- **Modbus RTU Communication**

  The CVM32A device can be configured to operate in Modbus RTU mode, serving as a client within the Modbus network. This facilitates robust and reliable data exchange over this industry-standard protocol.

- **Integration with LabView**

  Data acquisition and instrument control can be achieved through LabView, using either a direct TCP connection from CvmManager or through serial communication, offering flexible integration options.

```
13  async def main():
14      # Communication settings
15      baud_rate = 1000000
16      cvm32a_address = 0xA1
17
18      # Establish connection with COM port
19      my_ports = discover_serial_ports()
20      bus_sn = get_serial_from_port(my_ports[0])
21      my_bus = SerialBus(bus_sn, port=my_ports[0], baud_rate=baud_rate, protocol_type=ProtocolEnum.XC2)
22      await my_bus.connect()
23
24      # Creating an instance of CVM24P device
25      my_device = XC2Cvm24p(my_bus, cvm32a_address)
26
27      # Reading structure of the registry
28      await my_device.initial_structure_reading()
29
30      await my_device.read_reg_by_name('ch_avg_V')
31      print(f"Register ch_avg_V: {my_device.get_reg_by_name('ch_avg_V')}")  # averaged channels values!
32
33
34  if __name__ == "__main__":
35      asyncio.run(main())
```

• **Python Library for Custom Scripting**

A dedicated Python library is available, providing developers with the tools to create custom scripts for data handling and device interaction. This library enhances the programmability and versatility of the integration.

• **Modbus TCP via External Gateway**

For environments requiring Modbus TCP communication, an external gateway such as the RPi kit can be utilized. This setup allows the system to connect with TCP networks, expanding its compatibility and application scope.

• **Smart integration with Raspberry PI**

With the flexibility of Raspberry Pi, you can develop and implement custom scripts and applications that tailor the monitoring system to you specific needs. You can access, collect and process real-time data and make adjustments remotely.

Kolibrik integration example - **CVM-S48P** with **Raspberry PI**

These integration methods ensure that users can customize their experience to meet specific requirements and preferences, leveraging the full capabilities of our technology in a variety of operational contexts.

Ordering Information examples

| CVM-S24P | Power source KMS-PWR; 1x CVM-24P
24 channels total
Out of Box Solution | |

| CVM-S48P | Power source KMS-PWR; 2x CVM-24P
48 channels total
Out of Box Solution | |

| CVM-S120P | Power source KMS-PWR; 5x CVM-24P
120 channels total
Out of Box Solution | |

| CVM-E24P | Extension for assembly set; 1x CVM-24P
24 additional channels
Extension for set | |

CVM Set Package Contains

- 1x KMS-PWR; $n^{*)}$ x CVM-24P; 1x DC Power connector; 1x USB cable;
- 1x XC2 bus cable; $n^{*)}$ x clamps for I/O, CAN and chaining; DIN rail holders

*) n - number of 24-channel modules

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