

EMS Toolkit

ENP-AI6 M2

Universal Communication Module



The ENP-AI6 M2 module has 6 independent, galvanically isolated analog inputs. Inputs 3 and 4 can be configured via software for current measurement using built-in resistors, while inputs 5 and 6 support resistance temperature sensor measurement. The module is designed for use with sensors that output voltage or current, resistance temperature sensors such as PT1000, and voltage measurements, including individual cell voltage in a serialized battery pack.

The ENP-AI6 M2 module features a wired bus interface based on the Enapter Link protocol, enabling multiple modules to be linked and ensures reliable communication and seamless integration with top-level systems, such as the Enapter Gateway. It also includes wireless Wi-Fi capabilities for secure data transmission and control via the Enapter Gateway and/or Enapter Cloud.



UCM ENP-AI6 M2
go.enapter.com/ENP-AI6-M2

Technical Data

Power supply	Voltage Range: 9 to 24 V DC Protections: - Reverse polarity protection - Crowbar overvoltage protection (resettable fuse)
Power consumption	Full Load: 7 W, Peak
Analog Inputs	Isolation: - Individual for each input, galvanically isolated from the power supply and other interfaces Voltage mode (All inputs): -52V...0...+52V, input resistance: ~200 kΩ Current mode (Inputs 3, 4): -25mA...0...+25mA, input resistance: 100 Ω Resistance thermometer mode (Inputs 5, 6): - Supported resistance range: 100–2000 Ω - Input resistance: 28 MΩ - Precision excitation current: 200 μA
Resolutions / Accuracy	24 bit ADC - Voltage mode: ±0.2% Max FSR - Current mode: ±0.3% Max FSR - Resistance measurement mode: ±0.2% Max FSR + 1Ω
Wireless Communication	Wi-Fi 2.4 GHz, IEEE 802.11b/g/n, 20 MHz/40 MHz bandwidth, data rate up to 150 Mbps Bluetooth v5: Bluetooth LE, Bluetooth mesh, data rate up to 2 Mbps Power: Up to +20 dBm
Wired Interface	Protocols Supported: Enapter Link Baud Rate: Up to 0.5 Mbps Isolation: Galvanically isolated from the power supply Internal Bus Terminator ¹: 120 Ω, enabled via DIP switch (default: off)
Local signaling	1 LED - Status (Green): - Steady: Correct operation - Blinking: Establishing connection with the server (Enapter Gateway or Cloud) 1 LED – Error (Red): Indication of module error or internal running logic error, can be programmed by the user (see programming manual)
Mounting	35 mm Din rail acc. to IEC 60715
Height • Depth • Width	90.2 mm (3.55 inch) • 57.5 mm (2.26 inch) • 36.3 mm (1.43 inch)
Net weight	0.090 kg

Environmental Conditions

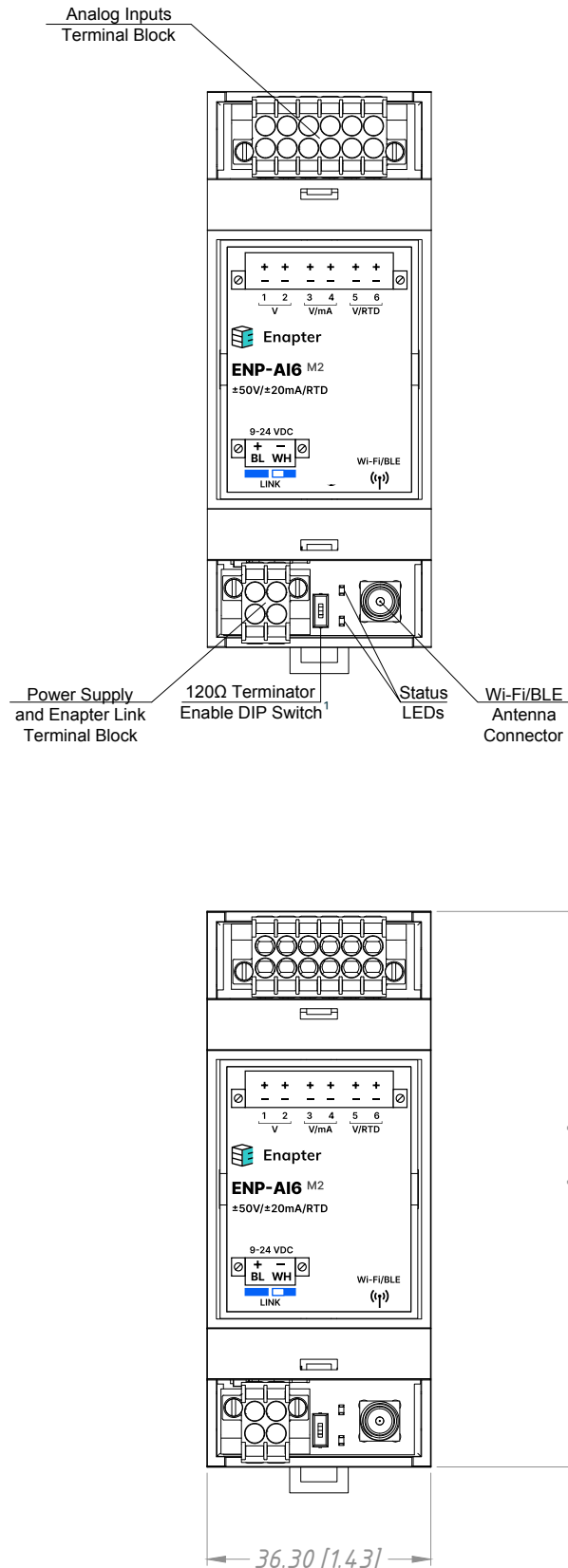
Ambient air temperature for operation	-40 – +60 °C
Ambient air temperature for storage	-40 – +60 °C
Relative humidity for storage and operation	20 – 90 %, without condensation
Operating altitude	0 – 2000 m
Storage altitude	0 – 3500 m
Pollution degree	2
IP degree of protection	IP20

Connection

Wire cross-section	Power Supply / Enapter Link / Relay Connection: Wire Size: 0.14 to 1.5 mm ² / AWG 26 to 16 (use appropriate wire size for the output connected load) Strip Length: 10 mm Temperature resistance: -40 – +105 °C / -40 – +221 °F Push-in connection technology, fast wiring
Antenna connection type	SMA-F (module) – SMA-M (antenna), 2.4 GHz

Module Overview

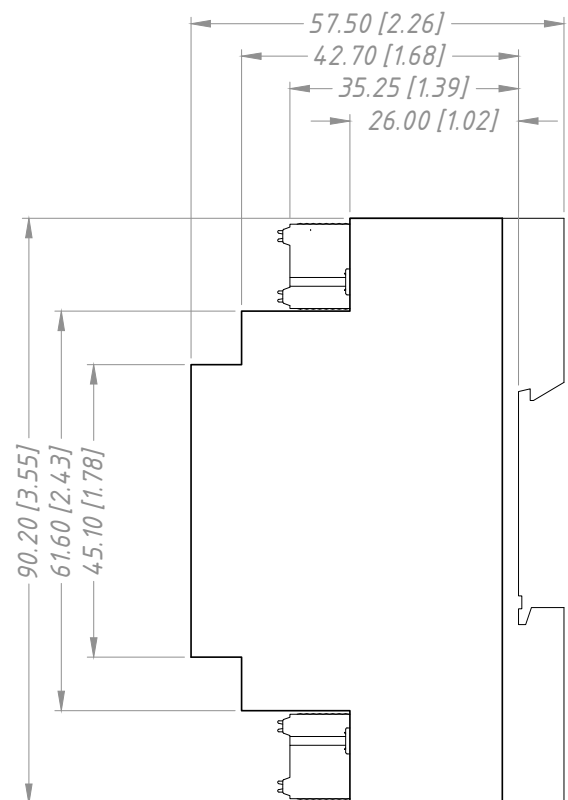
The dimensions are in mm and in brackets in inch.



¹ The terminator is a resistor used at the ends of a differential data bus, to reduce signal reflections. The module has a built-in terminator, which can be enabled if the device is positioned at the end of the bus. However, in some cases, even if the device is at the end of the bus, enabling the terminator may degrade or disrupt communication. This depends on various factors, such as baud rate, line length, signal rise time, and the characteristics of connected third-party equipment, which cannot be predicted in advance.

General recommendation: Try enabling the terminator if communication is unstable. For short line lengths (less than one meter) and relatively low baud rates (such as 115200), enabling the terminator is likely unnecessary.

Since the module has six independent, galvanically isolated input channels, measuring different voltages with a shared common ground requires connecting each "-" terminal of the ENP-AI6 M2 module accordingly.

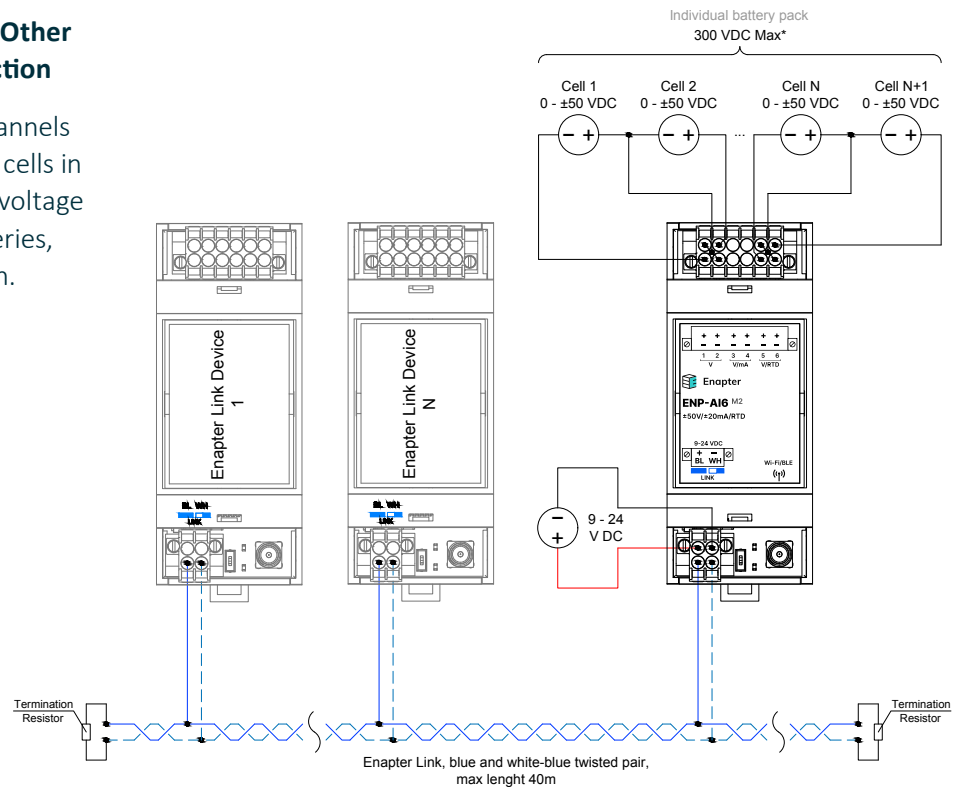


Wired Connection Example

Measuring Individual Cell Voltages (Or Other Voltage Sources) in a Serialised Connection

The example below shows how input channels 1, 2, 5 and 6 are connected to individual cells in a serialised battery pack. Since the total voltage depends on the number of cells in the series, the overall voltage can become very high.

The module is connected to the Enapter Link bus alongside other Enapter modules. The Enapter Link bus requires terminators at both ends, which is built into the module and can be enabled via a DIP switch if the module is positioned at the end of the bus. (Note that while separate resistors are shown in the diagram, they should not be used if the internal terminator is enabled.)

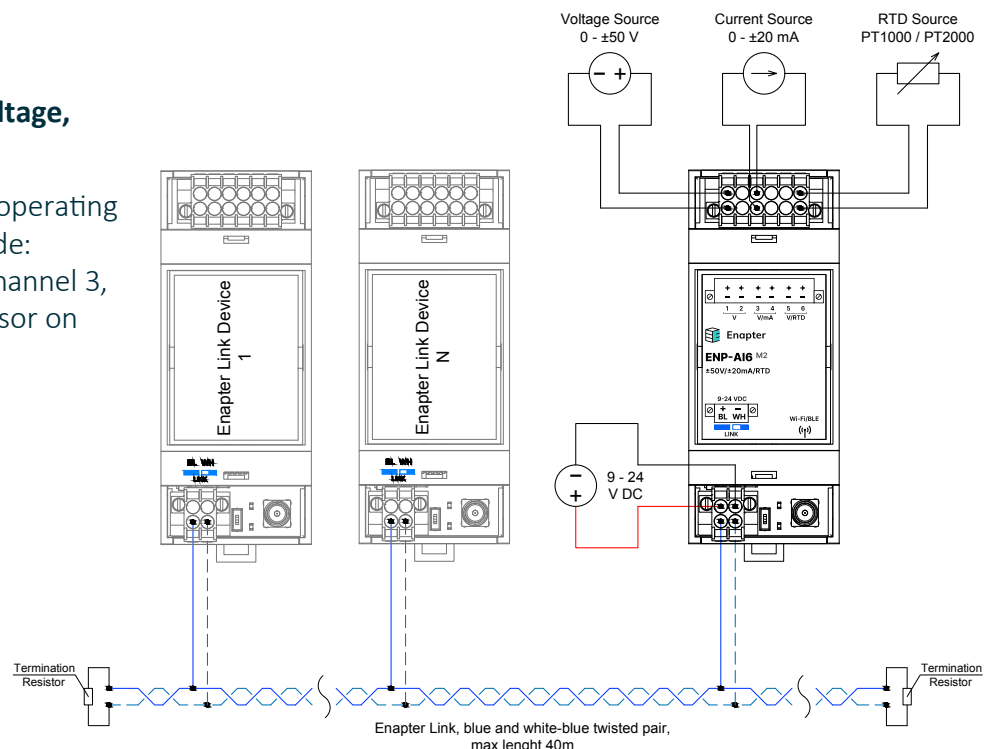


*** Note:** Do not connect any input channel if it causes the voltage potential difference to exceed 300V with any other channel.

Simultaneous Measurements: Voltage, Current and Temperature

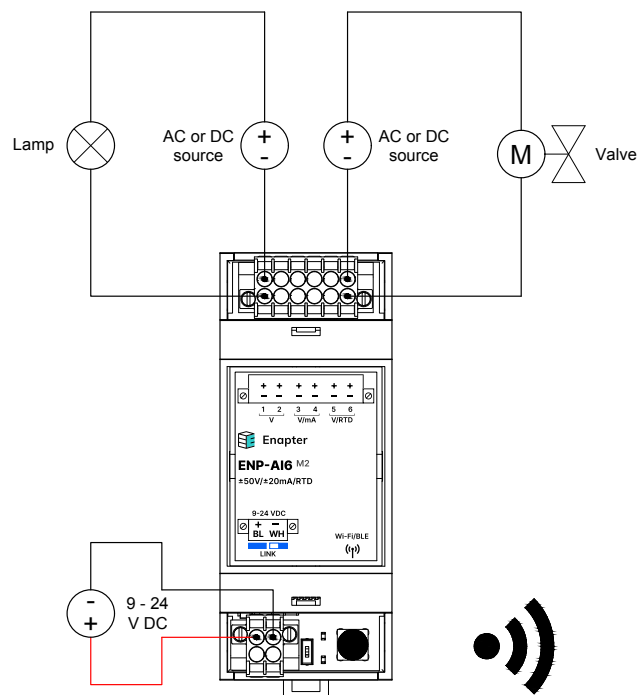
Here is an example of the module operating in simultaneous measurement mode: voltage on channel 1, current on channel 3, and temperature using an RTD sensor on channel 6.

The module is connected to the Enapter Link bus alongside other Enapter modules. The Enapter Link bus requires terminators at both ends, which is built into the module and can be enabled via a DIP switch if the module is positioned at the end of the bus. (Note that while separate resistors are shown in the diagram, they should not be used if the internal terminator is enabled.)



Wireless Connection Example

Here you can find an example of a wireless connection, where the module is connected to the same analog outputs as in the previous example, the module operating in simultaneous measurement mode: voltage on channel 1, current on channel 3, and temperature using an RTD sensor on channel 6. However, unlike the wired Enapter Link connection, the setup and data exchange occur through a secure Wi-Fi network. For instructions on configuring the wireless connection, please refer to the Quick Start Guide.





- Alternating current voltage of 220V / 110V is potentially lethal!
- All works on assembly and installation should be performed only with a disconnected power supply!
- The installation and assembly of device must be carried out by electrician in accordance with the applicable regulations.
- This device must be mounted on a DIN rail in an electrical distribution enclosure accordingly with this manual to ensure protection against contact, water and dust.
- This device must not be used as part of safety-critical systems.
- Edge processing scripting should be used as a convenience feature for basic non-realtime automation and not for life-sustaining or safety-critical use cases. Normal operation depends on working internet, Wi-Fi, and Enapter Cloud. Enapter is not responsible for any harms or losses incurred as a result of any failed automation.