EN-SERIES IO MODULE

EN-4AO

The EN-4AO is a compact DIN-rail mounted analog output module with 4 analog outputs. It communicates over Modbus RTU on RS485, so it works as an expansion module for the EN-CPU-V7 controller or with any third-party Modbus master.

Each output provides a 0–10 V DC control signal for modulating equipment — VFD speed references for AHUs and pumps, chilled water control valves and modulating dampers.

Modbus RTU | RS485 | 4 AO | 0–10 V DC

4 AO	0–10 V	Modbus RTU	110 × 70	24 V
Analog outputs	DC control signal	RS485 slave	Compact footprint (mm)	AC/DC supply

FEATURES & BENEFITS

- 4 analog outputs, 0–10 V DC
- Direct speed reference for AHU and pump VFDs
- Drives modulating valves and damper actuators
- Compact 110 × 70 × 70 mm housing for small panels
- Modbus RTU slave on RS485 (B, A, GND)
- Works with EN-CPU-V7 or any third-party Modbus master
- No configuration required — ready to write from the master
- Customer-specific IO configuration available on request
- Failed modules are replaced on site without re-programming

APPLICATIONS

AHU VFD Speed
Supply and return fan speed reference

Control Valves
Chilled / hot water valve modulation

Pump VFD Speed
Variable-flow pumping control

Modulating Dampers
Fresh air and return air damper position

Typical sectors: Commercial buildings · IT parks · Pharmaceutical · Healthcare · Data centres · Industrial

TECHNICAL DATA

OUTPUTS	
Analog outputs	4
Signal type	0–10 V DC
4–20 mA option	To be confirmed

COMMUNICATION	
Protocol	Modbus RTU (slave)
Interface	RS485 — B, A, GND
Baud rate	To be confirmed
Compatible masters	EN-CPU-V7, third-party Modbus masters

CONFIGURATION	
Set-up	No configuration required
Custom IO	Customer-specific configuration on request
Commissioning	Modbus master utility (e.g. Modscan) via USB-to-RS485, or EN-CPU-V7 over IP

POWER	
Supply voltage	24 V AC/DC
Power consumption	To be confirmed

OPERATING ENVIRONMENT	
Operating temperature	0 °C to 50 °C
Operating humidity	0–95 % RH

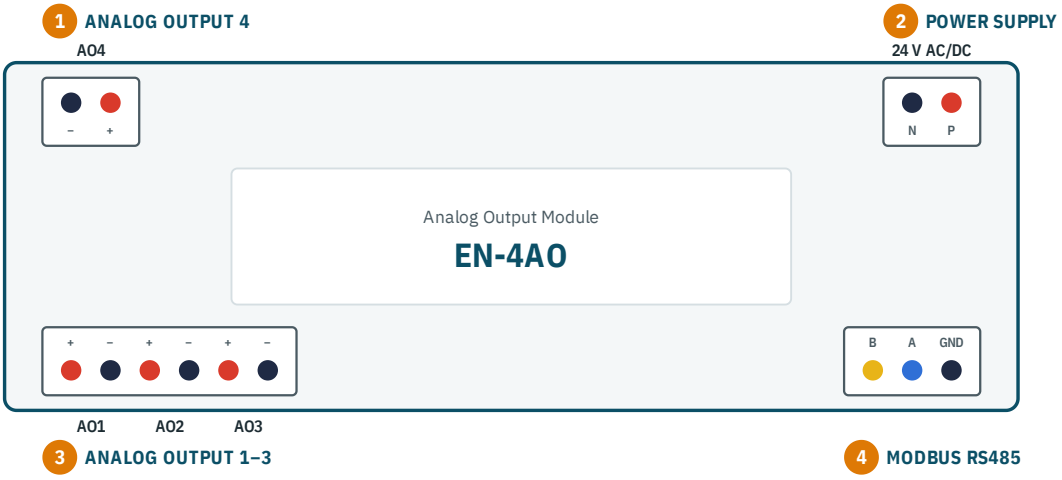
MECHANICAL	
Dimensions (L × W × H)	110 × 70 × 70 mm
Mounting	DIN rail
Enclosure	ABS

STANDARDS & CERTIFICATIONS	
Certifications	CE, RoHS

ORDERING INFORMATION

PART NUMBER	DESCRIPTION
EN-4AO	EN-series analog output module — 4 AO (0–10 V DC), Modbus RTU RS485, 24 V AC/DC, DIN rail, 110 × 70 × 70 mm
EN-CPU-V7	SmartNova DDC Controller — Modbus master for EN-series IO modules (ordered separately)

TERMINALS & WIRING



Terminal layout as viewed from the front of the module.

NO.	GROUP	TERMINALS	SIGNAL	DESCRIPTION
1	**Analog output**	**AO4: −, +**	0–10 V DC	Control signal to VFD, valve or damper actuator
2	**Power supply**	**N, P**	24 V AC/DC	Module supply input — P: + supply, N: − supply
3	**Analog outputs**	**AO1–AO3: +, −**	0–10 V DC	Control signals to VFDs, valves or damper actuators
4	**Modbus RS485**	**B, A, GND**	Modbus RTU	Connection to an EN-CPU-V7 RS485 port or third-party Modbus master

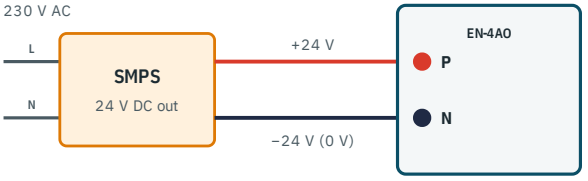
IO WIRING

- Connect AO + to the 0–10 V control input and AO − to the signal common of the VFD or actuator.
- Observe polarity — note AO4 terminals are ordered −, + on the top row.
- Use shielded cable for analog signals and keep it away from mains and VFD power wiring.
- Write output values to holding registers 40001–40004 from the Modbus master.

RS485 BUS WIRING

- Use shielded twisted-pair cable and daisy-chain modules on the bus.
- Connect B, A and GND to the same terminals on the master and every module.
- Fit 120 Ω termination at both ends of long bus segments.
- Segment length up to 1200 m per TIA/EIA-485, reduced at higher baud rates.

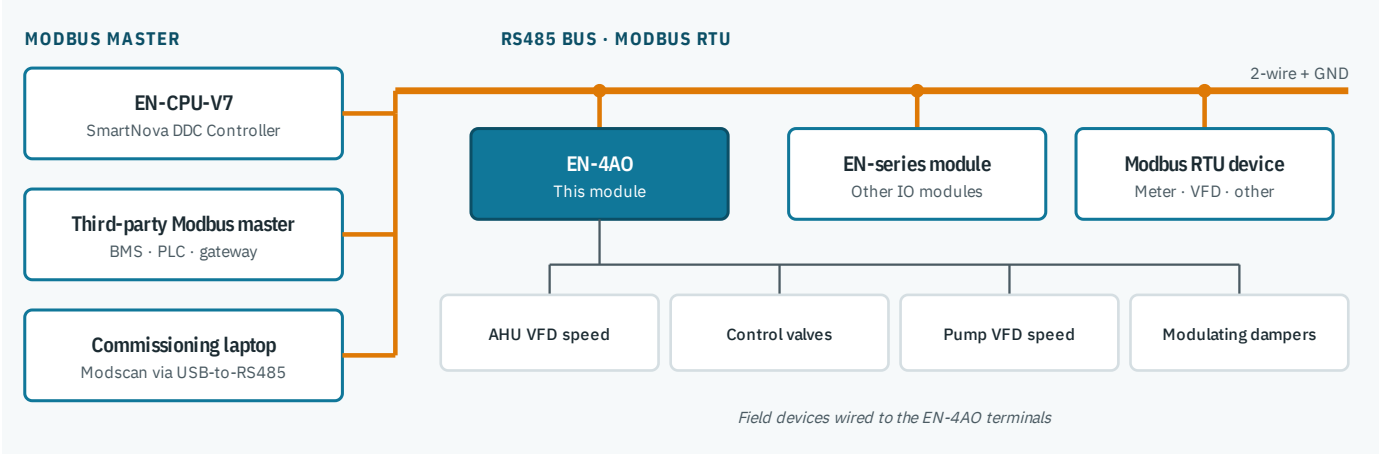
POWER SUPPLY WIRING



24 V AC/DC input

- Supply from a 24 V AC/DC source, such as a 230 V AC to 24 V DC SMPS.
- Connect + supply to terminal P and − supply to terminal N.
- One SMPS can feed several modules; size it for the total load.

SYSTEM ARCHITECTURE



Field devices wired to the EN-4AO terminals

MODBUS COMMUNICATION

COMMUNICATION SETTINGS

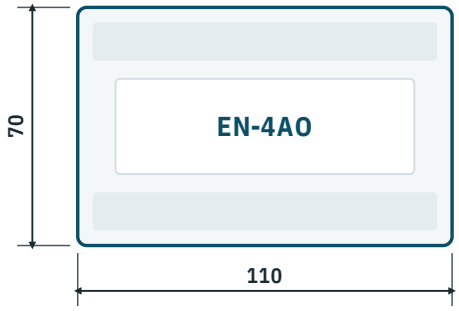
Protocol	Modbus RTU, slave
Physical layer	RS485, 2-wire + GND
Baud rate	To be confirmed
Default slave address	To be confirmed
Data format	To be confirmed
Function codes	03, 06

Addresses use the standard Modbus 4x notation, as listed in the module address details. Register scaling for output values to be confirmed.

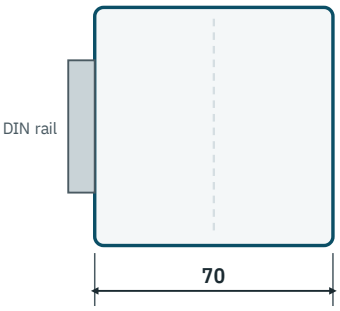
MODBUS REGISTER MAP

NO.	IO POINT	ADDRESS	TYPE	ACCESS
1	AO-1 (0–10 V)	40001	Holding register	R/W
2	AO-2 (0–10 V)	40002	Holding register	R/W
3	AO-3 (0–10 V)	40003	Holding register	R/W
4	AO-4 (0–10 V)	40004	Holding register	R/W

DIMENSIONS



FRONT VIEW



SIDE VIEW

Overall dimensions

110 × 70 × 70

L × W × H (mm)

Mounting

DIN rail

Enclosure

ABS

INSTALLATION

- Mount on DIN rail inside a control panel or enclosure.
- Leave space around the unit for ventilation and cable access.
- Isolate the power supply before wiring or servicing.
- Route RS485 and analog output cables away from power and VFD wiring.
- A failed module can be replaced on site and the system resumes without re-programming.

COMMISSIONING

1. Mount the module and connect the 24 V AC/DC supply.
2. Wire AO1–AO4 to the 0–10 V inputs of VFDs, valves or dampers as per the wiring drawing.
3. Connect RS485 B, A, GND to the EN-CPU-V7 port or Modbus master.
4. Write output values using the Modbus register map.
5. Verify outputs with Modscan over USB-to-RS485 or through EN-CPU-V7 over IP.

SYSTEM REQUIREMENTS

- EN-CPU-V7 controller or any third-party Modbus master
- Modbus master utility (e.g. Modscan) for commissioning
- USB-to-RS485 converter for commissioning over serial
- 24 V AC/DC power supply
- DIN rail mounting inside a control panel

SAFETY INFORMATION

- ▲ Installation, wiring and maintenance must be carried out by qualified personnel in line with local electrical regulations.
- ▲ Disconnect all power before connecting or removing terminal wiring.
- ▲ Install inside a closed control panel, protected from dust, water and direct sunlight.
- ▲ Operate only within the supply voltage and environmental limits stated in this datasheet.
- ▲ Observe ESD precautions when handling the unit.
- ▲ Dispose of the product as electronic waste in accordance with local e-waste regulations.

SERVICES & SUPPORT

Technical support	Installation & setup	Maintenance	Application support	Hardware support	Warranty

EnSmart™ Smart way to connect buildings

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