EN-SERIES IO MODULE

EN-4AI-NTC

The EN-4AI-NTC is a compact DIN-rail mounted extension IO module with 4 analog inputs. 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 input accepts an NTC temperature sensor, a 0–10 V DC or a 4–20 mA signal with 12-bit resolution, with NTC and voltage / current readings on separate registers — ideal for AHU supply and return air and chilled water temperatures.

Modbus RTU | RS485 | 4 AI | NTC | 0–10 V | 4–20 mA

4 AI	NTC	12-bit	Modbus RTU	24 V
Analog inputs	Temperature sensors	ADC resolution	RS485 slave	AC/DC supply

FEATURES & BENEFITS

- 4 analog inputs for NTC, 0–10 V DC or 4–20 mA signals
- 12-bit ADC resolution
- Separate Modbus registers for NTC and 0–10 V / 4–20 mA readings
- Compact 110 × 70 × 70 mm housing for small panels
- Modbus RTU slave on RS485 (GND, A, B)
- Works with EN-CPU-V7 or any third-party Modbus master
- No configuration required — ready to poll from the master
- Customer-specific IO configuration available on request
- Failed modules are replaced on site without re-programming

APPLICATIONS

AHU Air Temperature
Supply and return air temperature with NTC sensors

Chilled Water
CHW supply and return temperature

Analog Transmitters
0–10 V DC or 4–20 mA field signals

Plant Monitoring
Analog values for BMS trending and alarms

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

TECHNICAL DATA

INPUTS	
Analog inputs	4
Signal types	NTC / 0–10 V DC / 4–20 mA
Resolution	12-bit ADC
Readings	NTC and 0–10 V / 4–20 mA on separate registers

COMMUNICATION	
Protocol	Modbus RTU (slave)
Interface	RS485 — GND, A (+), B (–)
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 terminals	+24V, –24V
Power consumption	To be confirmed

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

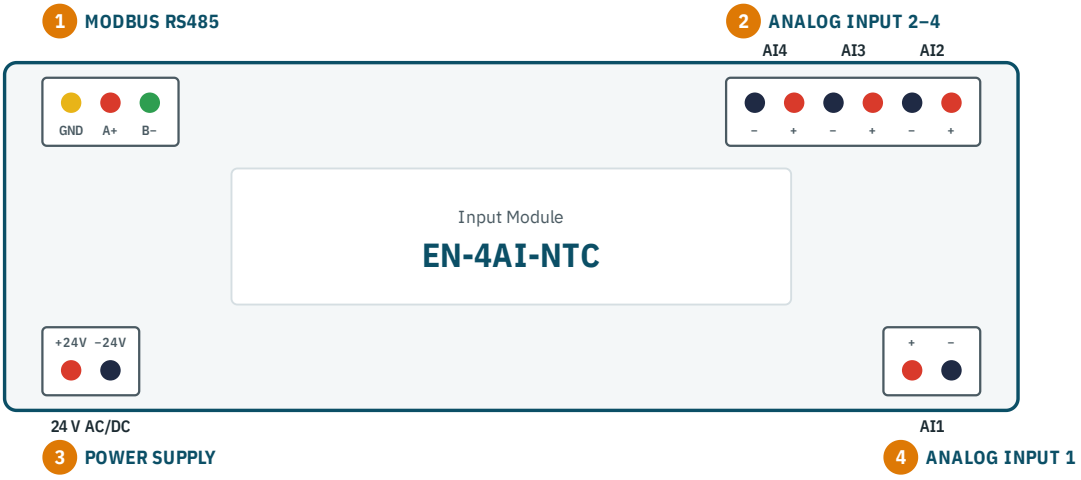
MECHANICAL	
Dimensions (L × W × H)	110 × 70 × 70 mm
Mounting	DIN rail
Enclosure	ABS

STANDARDS & CERTIFICATIONS	
Certifications	CE, RoHS

ORDERING INFORMATION

PART NUMBER	DESCRIPTION
EN-4AI-NTC	EN-series IO module — 4 AI (NTC / 0–10 V DC / 4–20 mA, 12-bit), 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	**Modbus RS485**	**GND, A (+), B (–)**	Modbus RTU	Connection to an EN-CPU-V7 RS485 port or third-party Modbus master
2	**Analog inputs**	**AI4, AI3, AI2: –, +**	NTC / 0–10 V DC / 4–20 mA	Temperature sensor or analog transmitter inputs 2–4
3	**Power supply**	**+24V, –24V**	24 V AC/DC	Module supply input
4	**Analog input**	**AI1: +, –**	NTC / 0–10 V DC / 4–20 mA	Temperature sensor or analog transmitter input 1

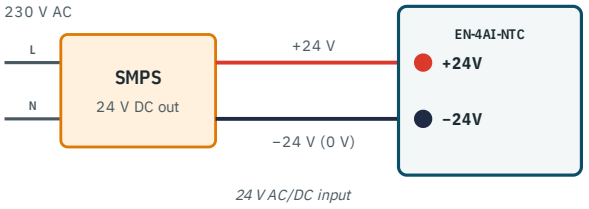
IO WIRING

- Wire each NTC sensor across the + and – terminals of its analog input.
- Observe + / – polarity when wiring 0–10 V DC and 4–20 mA transmitters.
- Read NTC values from 40006–40009 and 0–10 V / 4–20 mA values from 40002–40005.
- Use shielded cable for analog signals and keep it away from mains wiring.

RS485 BUS WIRING

- Use shielded twisted-pair cable and daisy-chain modules on the bus.
- Connect A (+), B (–) and GND to the matching 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.

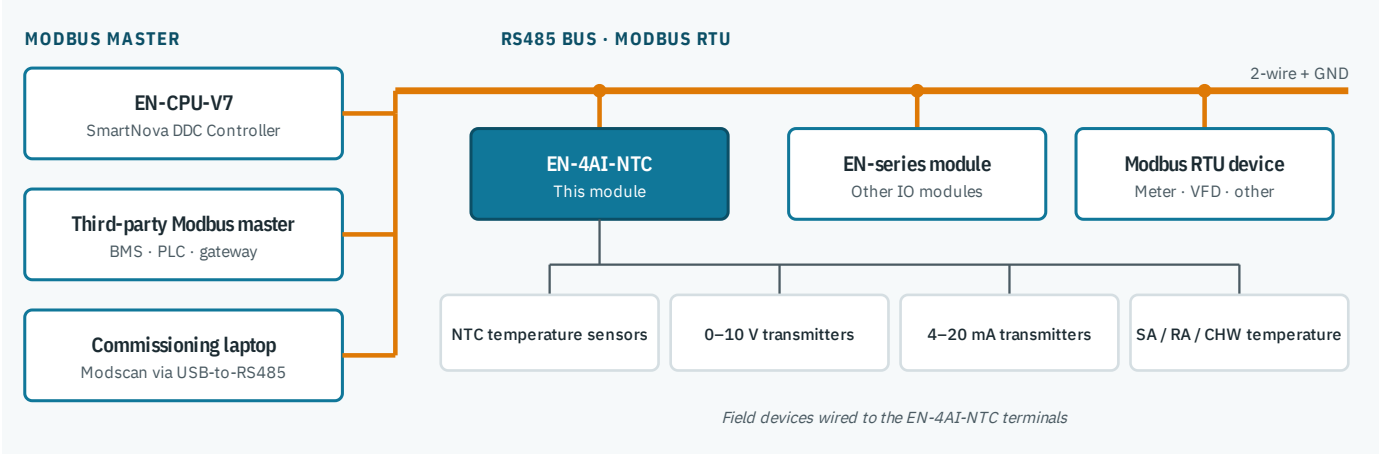
POWER SUPPLY WIRING



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 +24V and – supply to –24V.
- One SMPS can feed several modules; size it for the total load.

SYSTEM ARCHITECTURE



Field devices wired to the EN-4AI-NTC terminals

MODBUS COMMUNICATION

COMMUNICATION SETTINGS

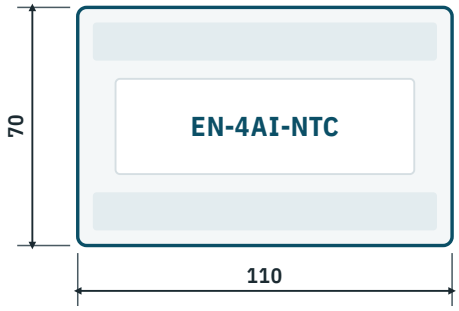
Protocol	Modbus RTU, slave
Physical layer	RS485, A (+), B (–), GND
Baud rate	To be confirmed
Default slave address	To be confirmed
Data format	To be confirmed
Function codes	03

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

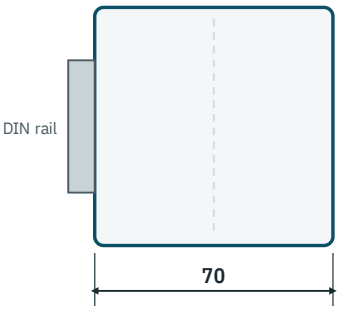
MODBUS REGISTER MAP

NO.	IO POINT	ADDRESS	TYPE	ACCESS
1	AI-1 (0–10 V / 4–20 mA)	40002	Holding register	R
2	AI-2 (0–10 V / 4–20 mA)	40003	Holding register	R
3	AI-3 (0–10 V / 4–20 mA)	40004	Holding register	R
4	AI-4 (0–10 V / 4–20 mA)	40005	Holding register	R
5	AI-1 (NTC)	40006	Holding register	R
6	AI-2 (NTC)	40007	Holding register	R
7	AI-3 (NTC)	40008	Holding register	R
8	AI-4 (NTC)	40009	Holding register	R

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 signal cables away from power 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 NTC sensors or 0–10 V / 4–20 mA transmitters to AI1–AI4 as per the wiring drawing.
3. Connect RS485 A (+), B (–), GND to the EN-CPU-V7 port or Modbus master.
4. Poll the module using the Modbus register map.
5. Verify readings 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

EnSmart Controls
Erode · Coimbatore · Chennai — Tamil Nadu, India
+91 99410 42612 · www.ensmart.ai

Specifications are subject to change without notice. © 2026 EnSmart Controls. All rights reserved.