EN-SERIES IO MODULE

EN-4DIAI3DO2AO

The EN-4DIAI3DO2AO is a DIN-rail mounted extension IO module with 4 digital inputs, 3 relay outputs, 4 analog inputs and 2 analog outputs, combining monitoring and modulating control in a single unit. 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.

Analog inputs accept NTC 10K temperature sensors, 0–10 V DC or 4–20 mA signals, while the 0–10 V DC analog outputs drive VFDs, control valves and modulating dampers.

Modbus RTU | RS485 | 4 DI | 3 DO | 4 AI | 2 AO

4 DI	3 DO	4 AI	2 AO	24 V
Volt-free contact inputs	Relay outputs, 230 V, 3 A	NTC / 0–10 V / 4–20 mA	0–10 V DC outputs	AC/DC supply

FEATURES & BENEFITS

- 4 digital inputs for volt-free status contacts
- 3 relay outputs (C / NO), rated 230 V, 3 A
- 4 analog inputs for NTC 10K, 0–10 V DC or 4–20 mA signals
- 2 analog outputs, 0–10 V DC, for VFDs, valves and dampers
- Modbus RTU slave on RS485 (B, A, G)
- 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
- Modular design for fast, repeatable panel builds

APPLICATIONS

AHU Control
SA / RA temperature, start / stop and status

Chilled Water
CHW temperature and chiller commands

VFD Speed Control
0–10 V speed reference and feedback

Dampers & Valves
Modulating control with position feedback

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

TECHNICAL DATA

INPUTS & OUTPUTS	
Digital inputs	4, volt-free contact
Digital outputs	3, relay (C / NO), 230 V, 3 A
Analog inputs	4, NTC 10K / 0–10 V DC / 4–20 mA
Analog outputs	2, 0–10 V DC
Analog resolution	To be confirmed

COMMUNICATION	
Protocol	Modbus RTU (slave)
Interface	RS485 — B, A, G
Baud rate	Multiple baud rate options
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

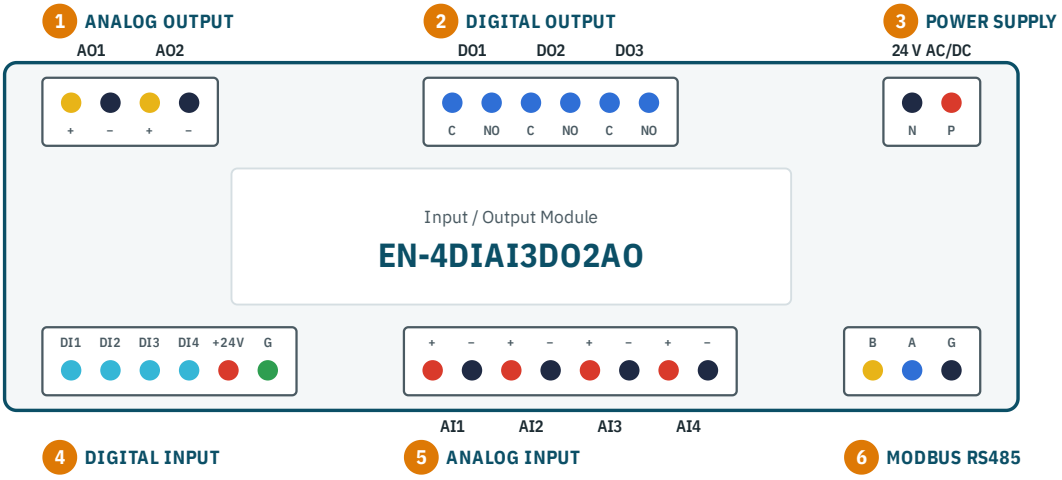
MECHANICAL	
Dimensions (L × W × H)	110 × 110 × 70 mm
Mounting	DIN rail
Enclosure	ABS

STANDARDS & CERTIFICATIONS	
Certifications	CE, RoHS

ORDERING INFORMATION

PART NUMBER	DESCRIPTION
EN-4DIAI3DO2AO	EN-series IO module — 4 DI (volt-free), 3 DO (relay 230 V, 3 A), 4 AI (NTC 10K / 0–10 V DC / 4–20 mA), 2 AO (0–10 V DC), Modbus RTU RS485, 24 V AC/DC, DIN rail
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 outputs**	**AO1–AO2: +, –**	0–10 V DC	Control signal to VFDs, control valves and modulating dampers
2	**Digital outputs**	**DO1–DO3: C, NO**	Relay, 230 V, 3 A	Relay contact per output — C = common, NO = normally open
3	**Power supply**	**N, P**	24 V AC/DC	Module supply input — P: + supply, N: – supply
4	**Digital inputs**	**DI1–DI4, +24V, G**	Volt-free contact	Status inputs for volt-free contacts, wired as shown in the wiring drawing
5	**Analog inputs**	**AI1–AI4: +, –**	NTC 10K / 0–10 V DC / 4–20 mA	Temperature sensor or analog transmitter inputs
6	**Modbus RS485**	**B, A, G**	Modbus RTU	Connection to an EN-CPU-V7 RS485 port or third-party Modbus master

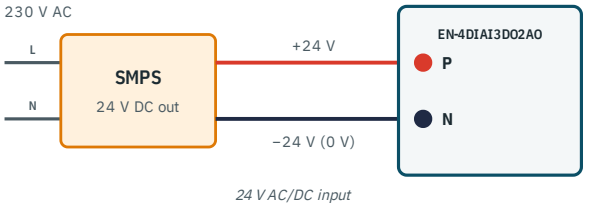
IO WIRING

- Digital inputs accept volt-free (dry) contacts only — do not apply external voltage.
- Relay outputs switch loads up to 230 V, 3 A; use an interposing relay or contactor for larger loads.
- Connect AO + / – to the 0–10 V DC control input of the VFD, valve or damper actuator.
- Observe + / – polarity on analog inputs and use shielded cable for all analog signals.

RS485 BUS WIRING

- Use shielded twisted-pair cable and daisy-chain modules on the bus.
- Connect B, A and G 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.

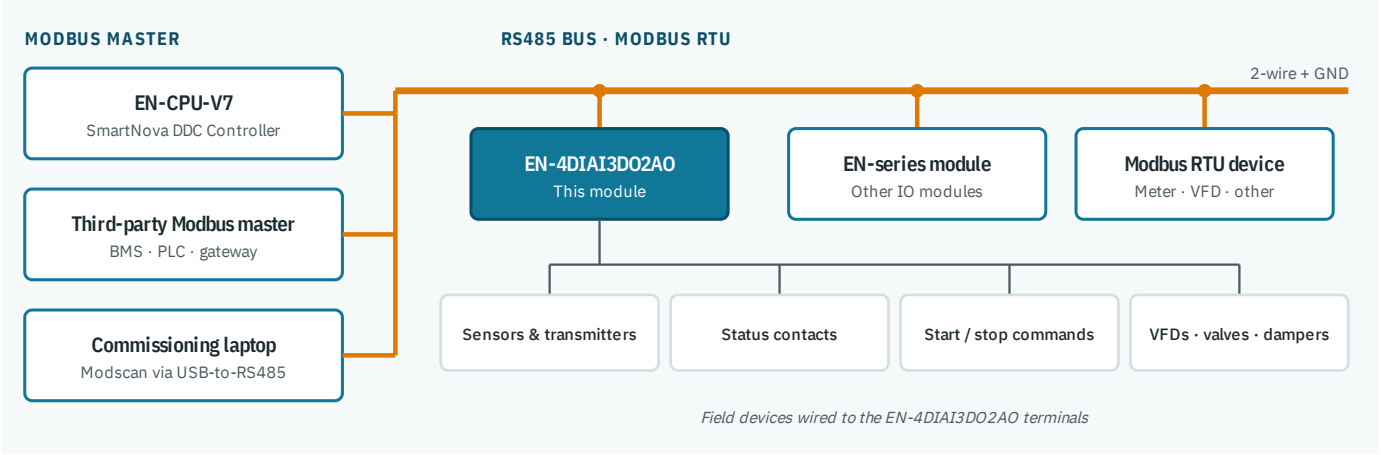
POWER SUPPLY WIRING



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-4DIAI3DO2AO terminals

MODBUS COMMUNICATION

COMMUNICATION SETTINGS

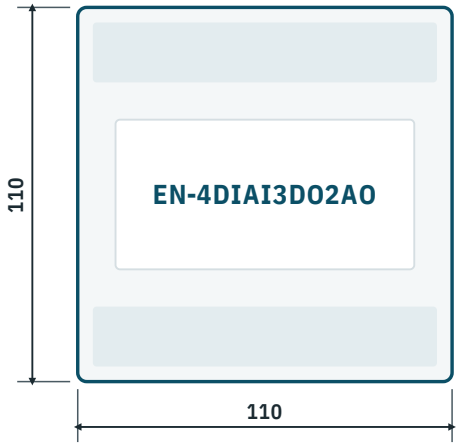
Protocol	Modbus RTU, slave
Physical layer	RS485, 2-wire + G
Baud rate	Multiple options
Default slave address	To be confirmed
Data format	To be confirmed
Function codes	01, 02, 03, 05, 06

Addresses use the standard Modbus 0x / 1x / 4x notation. Register scaling for analog inputs and outputs to be confirmed.

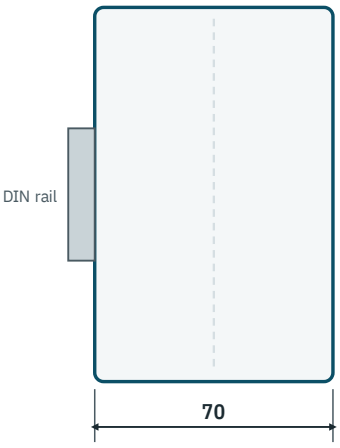
MODBUS REGISTER MAP

NO.	IO POINT	ADDRESS	TYPE	ACCESS
1	DI-1	10001	Input status	R
2	DI-2	10002	Input status	R
3	DI-3	10003	Input status	R
4	DI-4	10004	Input status	R
5	DO-1	00005	Coil status	R/W
6	DO-2	00006	Coil status	R/W
7	DO-3	00007	Coil status	R/W
8	AI-1 (0–10 V / 4–20 mA)	40002	Holding register	R
9	AI-2 (0–10 V / 4–20 mA)	40003	Holding register	R
10	AI-3 (0–10 V / 4–20 mA)	40004	Holding register	R
11	AI-4 (0–10 V / 4–20 mA)	40005	Holding register	R
12	AI-1 (NTC)	40006	Holding register	R
13	AI-2 (NTC)	40007	Holding register	R
14	AI-3 (NTC)	40008	Holding register	R
15	AI-4 (NTC)	40009	Holding register	R
16	AO-1 (0–10 V)	40010	Holding register	R/W
17	AO-2 (0–10 V)	40011	Holding register	R/W

DIMENSIONS



FRONT VIEW



SIDE VIEW

Overall dimensions

110 × 110 × 70

L × W × H (mm)

Mounting

DIN rail

Enclosure

ABS

All dimensions in mm.
Simplified outline.

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 and relay 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 digital inputs, relay outputs, analog inputs and analog outputs as per the wiring drawing.
3. Connect RS485 B, A, G to the EN-CPU-V7 port or Modbus master.
4. Poll the module using the Modbus register map.
5. Verify points 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, including relay output circuits, 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, relay rating 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

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