

ION8 EB

Industrial wireless bridge · ETH Bridge and ETH2BLE modes



Overview

ION8 EB is an industrial bridge that connects a PLC's Ethernet port to the ION8 wireless I/O family. The same hardware operates in one of two modes selected from the web interface:

ETH Bridge

Collects up to 8 ION8 RIO stations over Bluetooth LE 5 and presents the data to the PLC/SCADA via Siemens S7 PUT/GET, Modbus TCP, EtherNet/IP and OPC UA. RS485 Modbus RTU master or slave.

ETH2BLE

Transparent point-to-point Ethernet and RS485 serial tunnel between two EBs. Includes TIA Portal discovery/online/download; the IP plan does not change.

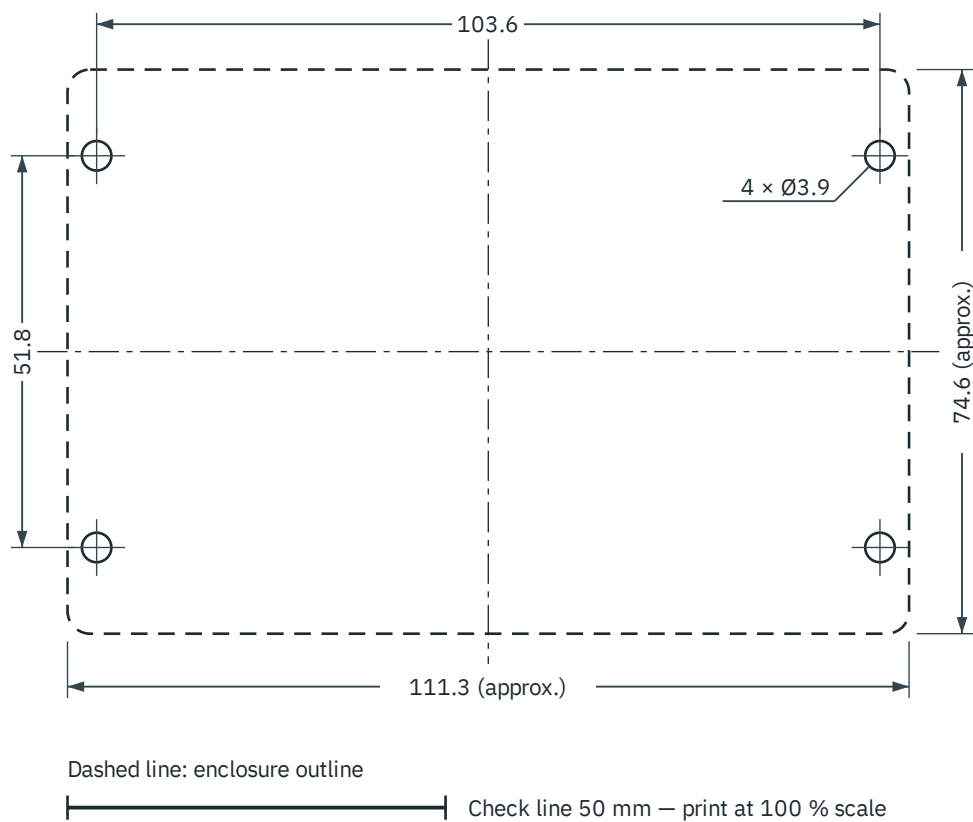
Technical specifications

ELECTRICAL	
Supply voltage	10–30 VDC (typ. 24 VDC)
Current (24 VDC)	max. 150 mA
Protection	Reverse polarity, overcurrent, overtemperature
Connection	8-pole removable screw terminal (supply + RS485)
COMMUNICATION INTERFACES	
Ethernet	1 × RJ45, 10/100 Mbit/s, auto speed/duplex
RS485	1 port, 2-wire half duplex · 300–230400 baud · 120 Ω termination selectable at the terminal
Wireless field link	Bluetooth LE 5 · adaptive frequency hopping · adaptive RF power · Speed / Range connection profile (ETH Bridge)
Management	Wi-Fi management access point (configuration only; open for an adjustable time after power-up) · web interface · ion8eb.local over Ethernet in ETH Bridge
ANTENNA AND RANGE	
Antenna options	Internal antenna or model with external antenna connector
Range (ETH2BLE, external antenna)	Up to 500 m in line of sight; depends on environment and placement
MECHANICAL AND ENVIRONMENTAL	

Dimensions / weight	120 × 75 × 40 mm (incl. antenna outlet) / 105 g
Mounting	Screw mounting, 4 × Ø3.9 mm, hole spacing 103.6 × 51.8 mm (no DIN rail)
Maximum ambient temperature	70 °C
Front panel	Pairing button · 4-step signal LED · power indicator
SERVICE	
Diagnostics	Boot count, last reset reason, uptime, signal/loss/disconnect counters, firmware build signature
Firmware update	By authorized service, with a signed package over Wi-Fi (no USB needed); pairing and settings are preserved

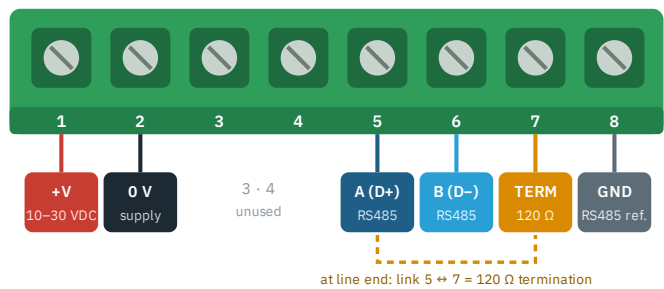
Mounting hole template (1:1)

Mounting hole template — scale 1:1, dimensions in mm



Print the page without scaling (100 %) and verify the 50 mm check line with a ruler; then fix the template to the mounting surface and mark the hole centres. Dimensions in mm.

Terminal layout



No.	Signal	Note
1 / 2	+V / 0 V	10–30 VDC supply
3 / 4	—	Not used
5 / 6	RS485 A (D+) / B (D-)	Twisted pair
7	Termination	Link to 5 → 120 Ω line termination
8	RS485 reference	GND/reference of the remote device

ETH Bridge mode

FIELD SIDE	
RIO station	8 slots (0–7) · ION8 remote I/O family (1010, 1020, 1030, 1111, 1324, 1325, 2020, 2040, 2222, 3030, 3040, 3333, 4040, 4444, 5050, 5555)
Data per slot	48 words input + 48 words output + 8 words diagnostics · up to 40 tag routes
Data types	U16, I16, U32, I32, FLOAT32 · byte order selection for 32-bit values (Modbus/OPC UA)
Connection profile	Persistent Speed (shortest response, close range) or Range (long range, harsh environment; default) · connection timing is set automatically according to the number of connected devices
Data transfer	Change-based: input/output changes are sent immediately, sparse heartbeat when nothing changes
Pairing	Scan + assign to slot from the web interface · pairing mode closes automatically after 5 min · locate RIO (LED)
PLC / SCADA SIDE	
Siemens S7 PUT/GET	Client · 1 PLC · PUT DB (RIO inputs → PLC) + GET DB (PLC → RIO outputs) · DB size automatic from selected tags, max. 768 bytes · automatic splitting according to PDU · 32-bit Siemens byte order · TIA Portal DB structure export (SCL/table) · GET 100 ms, PUT on change + 5 s heartbeat (adjustable) · rack/slot adjustable · M/I/Q areas not supported
Modbus TCP	Server · port 502 · FC03 (≤125 words), FC06, FC16 (≤123 words) · adjustable Unit ID · single client recommended
OPC UA	Server · port 4840 · 2 sessions · read and write nodes · anonymous access, no security mode
EtherNet/IP	Client · Class 3 explicit Read/Write Tag · <code>INT[]</code> ≤128 elements · Read Tag → RIO outputs, Write Tag ← RIO inputs · CPU slot routing (CompactLogix/ControlLogix) or direct (Micro800) · disabled by default
RS485 Modbus RTU	Master: 8 nodes, per node 0–8 words read with FC03/FC04 and 0–8 words write (FC06/FC16), period / timeout / retry / command lifetime · Slave: EB areas are exposed to a serial master, write authority Network / Serial / Both
Network	DHCP · workshop fixed 192.168.0.3 · field static IP · <code>ion8eb.local</code>
Wi-Fi management access point	<code>ion8eb_XXXXXX</code> (network name changeable) · open at power-up and, after the last client leaves, for the set time (0–1440 min, default 2 min, 0 = continuous) · then closes; BLE and Ethernet keep running
Behaviour on PLC loss	S7: when the connection drops or no PLC data arrives for about 1.5 s, RIO outputs are set to a safe (zero) state · Modbus TCP, OPC UA, EtherNet/IP: no such behaviour, timeout supervision in the PLC program is recommended
Diagnostics / Expert	Separate section in the web interface: mirror register table (raw word values, write), slot diagnostics

Address map

1000–1255

RS485 node data

8 nodes × 32 words · read/write

2000–2383

RIO → PLC (inputs)

8 slots × 48 words · read-only

3000–3383

PLC → RIO (outputs)

8 slots × 48 words · writable

4000–4063

Diagnostics

8 slots × 8 words · read-only

Address formulas (zero-based Modbus address — not the 40001 notation)

Input: $2000 + 48 \times \text{slot} + \text{word}$

Output: $3000 + 48 \times \text{slot} + \text{word}$

Diag.: $4000 + 8 \times \text{slot} + i$

RS485 node n: $1000 + 32 \times (n - 1) \rightarrow \text{read} + 0...7 \cdot \text{write} + 8...15 \cdot \text{status} + 16...30 \cdot \text{trigger} + 31$

Example: slot 2, word 5 input $\rightarrow 2000 + 96 + 5 = 2101$ · same word as output $\rightarrow 3101$ · node 3 read data $\rightarrow 1064...1071$

Diagnostic words ($4000 + 8 \times \text{slot} + i$): 0 status (bit 0 connected, bit 1 failsafe) · 1 EB signal strength · 2 RIO signal strength · 3 channel count / 37 · 4 lost packets · 5 disconnects · 6 configuration version.

ETH2BLE mode

Topology	Point-to-point, two ION8 EBs
Carried traffic	Transparent Ethernet frames (ARP, IPv4, VLAN-tagged, PROFINET DCP, S7, Modbus TCP) + RS485 byte stream
Commissioning	Button pairing (3 s) · role automatic · no IP / channel setup needed
Secure pairing	Device lock at first pairing · pairing group 1–65535 (multiple lines side by side)
MAC filter	Optional · ≤ 8 remote-side unicast addresses at each end · discovery traffic (ARP, DCP, DHCP, IPv6 ND) always passes
RS485 serial tunnel	300–230400 baud · 5–8 data bits · parity N/O/E · 1/2 stop · default 19200 8N2 · independent settings at each end · protocol independent
Signal indicator	4 LEDs, weighted average + 2 dB hysteresis
Wi-Fi management time	2–60 min (default 5); if nobody connects, Wi-Fi switches off completely and the device keeps working over BLE
Settings backup	JSON export/import, optional password inclusion
Factory reset	Hold the button at power-up: warning at 7 s, erase at 10 s

Usage limits

- Not suitable for applications requiring a deterministic 1–4 ms cycle such as PROFINET RT/IRT, for video, or for continuous high-bandwidth transfer.
- In ETH2BLE, Ethernet and RS485 share the same wireless capacity; the RS485 master response timeout must be set according to the wireless latency.
- For the ETH2BLE RS485 serial tunnel, the 8N2, 8N1 and 8O1 frame formats are recommended.
- In the Speed profile a weak signal can cause connection drops; if devices are far away or behind a metal enclosure, select the Range profile.
- OPC UA runs without security; use it only in an isolated control network.
- The wireless link is not a safety function; the safe state on loss of communication must also be ensured in the PLC program (the EB resets RIO outputs only on loss of the S7 connection).

