ABB FENA-21

01 Drive control over Ethernet

ABB FENA-21 connects a compatible drive to an industrial Ethernet control network. Its two Ethernet ports support drive commands, references, status exchange and supported network topologies through the selected communication protocol.

Controller project	Ethernet topology	FENA-21 adapter	Drive control unit

Command path

The adapter fits a supported drive control-unit option slot and exchanges signals and power through its internal connector. Network availability alone does not prove that the drive is taking commands from this interface: control-source selection, communication profile and process-data mapping must match the application.

Network continuity

FENA-21 supports a daisy chain with all three communication protocols. Device Level Ring is associated with EtherNet/IP, while Media Redundancy Protocol is associated with PROFINET IO. A simple chain can lose its downstream path when an intermediate device is powered off; use the intended ring architecture where the application requires continuity.

Protocol acceptance

Automatic Ethernet speed detection is available, but PROFINET IO requires 100 Mbit/s full-duplex operation. Adapter software, the selected drive firmware and the controller project determine the usable protocol functions. Verify the complete command-and-feedback path, including the configured response to a communication interruption, before enabling normal remote control.

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02 Network and internal interface ratings

Ethernet ports	2 × RJ-45: X1 and X2
Drive connector	20-pin internal connector
Supply from drive	3.3 V ±5%; maximum 400 mA
Ethernet transfer rate	10 or 100 Mbit/s
PROFINET link mode	100 Mbit/s, full duplex
Maximum Ethernet segment	100 m including patching
Maximum daisy-chain nodes	50 FENA-21 nodes
Network protocols	Modbus/TCP; EtherNet/IP; PROFINET IO
Ring protocols	DLR for EtherNet/IP; MRP for PROFINET IO
Cable category	CAT5 or higher

Adapter power boundary

At 3.3 V and 400 mA maximum, the nominal-voltage adapter load is 1.32 W by calculation. This is an internal drive-slot load and does not define a 24 V field-power connection or a PoE capability.

Segment length versus total network size

The 100 m limit applies to an individual Ethernet segment including patching. Separately, the daisy-chain design is limited to 50 FENA-21 nodes; a valid cable length does not override the node-count limit.

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03 Topology and command authority

Cable types	UTP, FTP or STP
Link negotiation	Automatic speed negotiation and Auto-MDIX
Diagnostic indicators	Three bicolor LEDs: HOST, MODULE, NETWORK/NET
Mounting screw torque	0.8 N·m
Protection class	IP20
Environmental limits	Applicable drive installation limits
Modbus/TCP service port	502; selected Modbus/TCP operation
EtherNet/IP explicit service	TCP 44818
EtherNet/IP implicit service	UDP 2222
PROFINET service ports	34962–34964; selected PROFINET IO operation

Continuity requires topology design

Two ports enable onward connection, but a simple chain is not redundant. Ring support must be configured according to the active industrial protocol and verified under the intended fault scenario.

Electrical link versus process authority

A correct negotiated rate verifies one layer of the connection. The drive may still use a different command source or interpret different process words, so commissioning must prove the application-level command and feedback path. Network service ports are protocol-specific: a port listed for one protocol is not evidence that all three control protocols are active at the same time.

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04 Where the network design changes the result

Remote drive command and feedback

Exchange start/stop commands, references and actual values through the selected communication profile and approved control-source settings.

EtherNet/IP ring networks

Use the supported DLR arrangement where the controller and network design require a protocol-aware ring rather than an ordinary daisy chain.

PROFINET IO integration

Coordinate device identity, process data and the 100 Mbit/s full-duplex link; apply MRP only within the intended redundant network design.

Daisy-chained drive cells

Connect X2 onward to the next adapter’s X1 while accounting for segment length, node count and the effect of an intermediate power loss.

Chain failure boundary

An unpowered or failed intermediate device can disconnect the rest of a daisy chain. This is a topology consequence, not a guarantee of fault-tolerant switching.

Frame connection

The mounting screw also provides an electrical connection used for cable-shield termination. A loose screw can impair EMC performance or operation.

Protocol-specific acceptance

Verify command source, reference scaling, status interpretation and fault response for the selected protocol rather than accepting the Ethernet link indicator alone.

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05 Replacement decisions and technical handover

Lifecycle and replacement scope

The manufacturing and support phase of the exact FENA-21 unit is unconfirmed. Compatibility with an installed drive does not by itself establish current production status. Preserve the supported drive and option-slot arrangement, adapter software compatibility and selected network protocol.

Why can a powered-down drive interrupt devices beyond FENA-21 in a chain?

The downstream path passes through intermediate adapters. If one device is powered off or fails, the rest of that chain can lose network access. Assess an appropriate supported ring topology when that consequence is unacceptable.

Can the same ring settings be used for EtherNet/IP and PROFINET on FENA-21?

No. FENA-21 supports DLR with EtherNet/IP and MRP with PROFINET IO. Match the network configuration and supervisory functions to the selected protocol, then verify the intended fault and recovery behavior.

Technical basis

ABB FENA-01/-11/-21 Ethernet adapter module user’s manual, 3AUA0000093568 Rev. E. FENA-21-specific hardware and topology apply; protocol functions depend on adapter software, selected protocol and supported drive firmware.

Other ABB product references

ABB AI815 3BSE052604R1

ABB CI801 3BSE022366R1

ABB CI840A 3BSE041882R1

Separate product references; no substitution or compatibility is implied.