Safety in installation

These instructions are for all who install or connect an optional module to a drive, converter or inverter and need to open its front cover or door to do the work.



WARNING! Obey these instructions. If you ignore them, injury or death, or damage to the equipment can occur.

- If you are not a qualified electrician, do not do installation or maintenance work.
- Disconnect the drive, converter or inverter from all possible power sources. After you have disconnected the drive, converter or inverter, always wait for 5 minutes to let the intermediate circuit capacitors discharge before you continue.
- Disconnect all dangerous voltages connected to other control signal connectors in reach. For example, it is possible that 230 V AC is connected from outside to a relay output of the drive, converter or inverter.
- Always use a multimeter to make sure that there are no parts under voltage in reach. The impedance of the multimeter must be at least 1 Mohm.

Drives

The table below shows the compatibility of FENA adapter module with different ABB drives.

Drives	FENA-01	FENA-11	FENA-21
ACS355	x	x	x
ACS380		x	x
ACSM1		x	x
ACS480		x	x
ACH580		x	x
ACQ580		x	x
ACS530*)		x	x
ACS560*)		x	x
ACS580		x	x
ACS850		x	x
ACS860*)		x	x
ACQ810		x	x
ACS880		x	x
ACS880-M04		x	x

*) check the compatibility in drive's release note

Protocols

The FENA adapter module is compatible with Ethernet standards IEEE 802.3 and IEEE 802.3u.

This table shows the protocols supported by the FENA adapter module from SW version 3.11 onwards.

	Modbus/TCP[1)]	EtherNet/IP™	PROFINET IO
FENA-01	x	x	x
FENA-11	x	x	x
FENA-21	x	x	x

[1] In addition to Modbus/TCP, FENA-01/-11/-21 supports Modbus over UDP.

[2] In addition to these protocol, it is possible to have the no communication protocol running on FENA adapter module. This configuration is called NONE protocol. In this setup, FENA adapter module is used only for running Ethernet services which can be enabled/disabled via Web pages. See *Appendix C – FENA configuration web pages* on page *435*. Also SNTP is available with NONE protocol).

The below table specifies the clients/masters that are compatible with the supported protocols.

Protocol	Compatible client/master
Modbus/TCP[1]	All Modbus/TCP clients that support: • Modbus Application Protocol Specification v1.1b • Modbus Messaging on TCP/IP Implementation Guide v1.0b
EtherNet/IP	All EtherNet/IP clients that support: • The CIP Networks Library, Volume 1, Common Industrial Protocol (CIP), Edition 3.0 May, 2006 • The CIP Networks Library, Volume 2, EtherNet/IP Adaptation of CIP, Edition 1.2 May, 2006 • Recommended Functionality for EtherNet/IP Devices Version 1.2, Feb., 2006
PROFINET IO	All PROFINET IO masters that support: • GSDML file version 2.31 • PROFINET IO protocol according IEC standards 61158 and 61784 • PROFINET-IO conformance class B

Tools

The FENA-11/-21 adapter module can be used in the Ethernet tool network for ACS880. The Ethernet tool network enables commissioning and monitoring several single drives, or inverter and supply units of a multi-drive from a single location by using the Drive composer pro PC tool.

Note: When the FENA-11/-21 adapter module is used only in the Ethernet tool network, the recommended setting for parameters

3

Overview of the Ethernet network and the FENA-01/-11/-21 module

Contents of this chapter

This chapter contains a short description of the Ethernet network and the FENA adapter module.

Ethernet network

Ethernet standards support a variety of physical media (coaxial cable, twisted pair, fiber optics) and topologies (bus and star). The FENA-01/-11/-21 adapter module supports twisted pair as the physical media in a star topology. In addition, FENA-21 supports a daisy chain topology with all protocols and DLR with EtherNet/IP and Media Redundancy Protocol (MRP) with PROFINET IO protocol.

The maximum length for an Ethernet segment on twisted pair media is 100 meters. All twisted pair media between the Ethernet node and the switch or router must be shorter than 100 meters, including media within patch panels. For more information, see chapter *Technical data*.

FENA-01/-11/-21 Ethernet adapter module

The FENA-01/-11/-21 Ethernet adapter module is an optional device for ABB drives which enables the connection of the drive to an Ethernet network.

Through the adapter module you can:

- give control commands to the drive (for example, Start, Stop, Run enable)
- feed a motor speed or torque reference to the drive
- give a process actual value or a process reference to the PID controller of the drive
- read status information and actual values from the drive
- reset a drive fault.

The protocols used to access these functionalities over Ethernet are described in chapters:

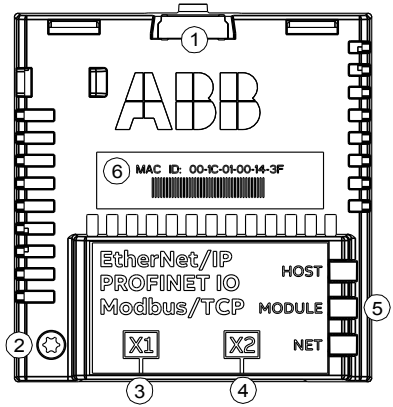
- *Modbus/TCP – Communication protocol*
- *EtherNet/IP – Communication protocol*
- *PROFINET IO – Communication protocol*.

The adapter module supports 10 Mbit/s and 100 Mbit/s data transfer rates and automatically detects the data transfer rate used in the network.

Note: PROFINET IO uses only 100 Mbit/s in the Full duplex mode.

The adapter module is installed into an option slot on the drive control unit. See the drive manuals for module placement options.

This figure shows the layout of FENA-21.



No.	Description	See chapter
1	Lock	*Mechanical installation*
2	Mounting screw	*Mechanical installation*
3	RJ-45 connector [X1] to Ethernet	*Electrical installation*
4	RJ-45 connector [X2] for chaining another module	*Electrical installation*
5	Diagnostic LEDs	*Modbus/TCP – Diagnostics* *EtherNet/IP – Diagnostics* *PROFINET IO – Diagnostics* *NONE - Diagnostics*
6	MAC address	-

Installing the adapter module

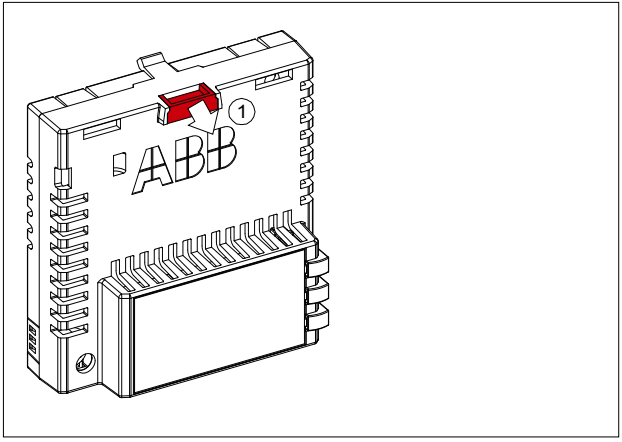
WARNING! Obey the safety instructions. See chapter *Safety instructions* on page *19*. If you ignore the safety instructions, injury or death can occur.

The adapter module has a specific position in the drive. Plastic pins, a lock and one screw to hold the adapter module in place. The screw also makes an electrical connection between the module and drive frame for cable shield termination.

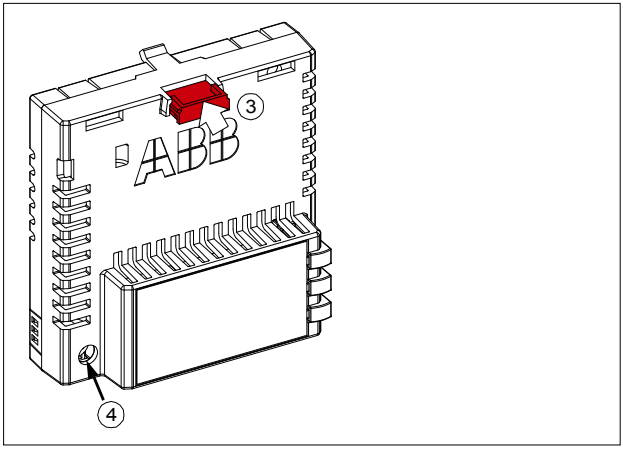
When the adapter module is installed, it makes the signal and power connection to the drive through a 20-pin connector.

When you install or remove the adapter module from the control unit:

1. Pull out the lock.



2. Put the adapter module carefully into its position on the drive.
3. Push in the lock.



4. Tighten the screw to torque 0.8 N·m using a Torx TX10 screwdriver.

WARNING! Do not use excessive force, or leave the screw too loose. Over-tightening can damage the screw or module. A loose screw decreases the EMC performance, and can even cause an operation failure.

See the applicable drive manual for further instructions on how to install the adapter module to the drive.

Connection procedure

1. Connect the network cable to the RJ-45 connector (X1) on the adapter module.
2. If you want to create a daisy chain with FENA-21 adapter modules, connect the X2 connector of the first adapter module to X1 on the next adapter module, and so on.

Note: If a device in the daisy chain is powered off or fails, the rest of the chain is disconnected from the network. In applications where this is not acceptable, consider using the ring topology instead.

Installation	Into an option slot on the drive control unit
Degree of protection	IP20
Ambient conditions	The applicable ambient conditions specified for the drive in its manuals are in effect.
Package	Cardboard. Plastic wrapping: Antistatic air bubble sheet (PE).
Indicators	Three bicolor LEDs (HOST, MODULE, NETWORK/NET)
Connectors	A 20-pin connector to the drive RJ-45 connector to Ethernet (X1) FENA-21 only: RJ-45 connector for chaining another adapter module (X2)
Power supply	+3.3 V ±5% max. 400 mA (supplied by the drive)
General	Complies with EMC standard EN 61800-3:2004 Printed circuit board conformal coated

Ethernet link

Compatible devices	Ethernet Standard IEEE 802.3 and IEEE 802.3u devices
Medium	10BASE-TX or 100Base-TX with Auto-negotiation and Auto-MDIX (Auto-crossover) • Wiring: CAT5/6 UTP, CAT5/6 FTP, CAT5/6 STP • Connector: RJ-45 • Termination: Internal • Maximum segment length: 100 m / 328 ft
Topology	Bus or star. Max. 50 nodes allowed for FENA-21 in a daisy chain topology.
Transfer rate	10 Mbps or 100 Mbps
Serial communication type	Half or full duplex
Protocol	Modbus/TCP, EtherNet/IP, PROFINET IO